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Original Article

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Study of Laundry Services in a Tertiary Care Government Hospital with Crtical Appraisal and Scope of Outsourcing

Abhishek Yadav[1], Mahesh Kumar[2], Lohith Kumar R.[3], Sanjay Kumar[4], Mohit Gupta[4]

Abstract

Introduction: Linen and laundry services are an integral part of the hospital support services and an indicative of the quality of Patient care. Service, Quality, Economy and timely delivery are the main aspects which have to be considered from an administrative point of view.

Objectives: Keeping the same in view, the study was conducted with the aim to critically analyze the organization and functioning of laundry services at a tertiary care Government Hospital with the scope of outsourcing the laundry services.

Conclusions: The constraints and the problems faced in the laundry were analyzed and the recommendations were given to improve the efficiency of laundry service. The authors conclude that the cost cutting measures should be taken instead of outsourcing the Laundry Services.

Keywords: Laundry; Hospital Linen; Hospital Infection; Outsourcing; Hospital Services.

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Introduction

Linen and laundry services are an integral part of the hospital support services and an indicative of the quality of Patient care. This word laundry is derived from launderer/ laundress which means washer man or washer woman. Hospital linen includes all the clothing made of cotton, linen or wool or synthetic fibers which are contaminated with blood, excreta or secretions from the patients. The main objective of laundry services is to provide adequate quantity and quality of clean and sterile linen including bed linen, towels, personal clothing, uniforms, scrub suits, gowns and drapes for operation theatres. Service, Quality, Economy and timely delivery are the main aspects which have to be considered from an administrative point of view [1-8]. Keeping the same in view, the study was conducted with the aim to critically analyze the organization and functioning of laundry services at a tertiary care Government Hospital with the scope of outsourcing the laundry services.

Materials and Methods

The study was conducted at a tertiary care Government Hospital as a part of Project for PG Diploma in Hospital Management from the Period of October 2012- September 2013. The identity of the hospital is not being revealed due to confidentiality. On the spot direct observational study was done to study the physical facility and layout of the laundry so as to compare it with standard normal guidelines. The Procedure followed or functioning of laundry was also done direct observation. The permission

was obtained from Officer Incharge on the ground of maintain confidentiality. The interview study was done and discussions were held with the authorities and staff at different levels who were willing to participate in the study to collect information on Laundry process, working of the machines, policies & procedure, organizational structure, functioning problems face by the staff, suggestion to laundry services. The same set of questionnaires was asked and the answers were cross-checked to eliminate the individuals bias. The distribution of duties among the staff and the record registers were also studied. Various other concerned ancillary departments like equipment repair, maintenance department and central stores were also visited to understand the support service to the Laundry.

Observations

The salient observations are mentioned as under:

1. The Hospital had an in-plant mechanized laundry that caters to the hospital needs of linen.
2. The laundry had two points of access which can be used entry as entry and exit.
3. The hospital laundry covered an area of approximately 1200 yards, rectangular in structure and the boiler room is located behind the laundry building in a separate room from the main laundry. There is a separate entry for the boiler room.
4. The workflow is in 'U' type and there are exhaust fans and enough windows all around the building for proper ventilation of the working area. A ventilation duct system is installed though it is not functioning to the best of its capability.
5. The water comes through the CPWD supply and is soft and does not need any further treatment.
6. Organizational Structure

Additional Medical Superintendent/ Special Administrative Grade-1

↓

Chief Medical Officer-1

↓

Medical Officer-1

↓

Laundry supervisor-1

↓

Head Clerk-1

↓

Store Keeper -1, Upper division clerk-1

↓

Head Laundry Operator-1

↓

Operators-6

↓

Nursing Orderly-1

↓

Safai Karamcharis and Multipurpose Courier Workers-20

7. The workload is 60,000-65,000 clothes/month. The load is approximately 3000 clothes/day or it is about 1500 kg of linen washed/day.
8. The laundry is mechanized and all the machines were installed when the laundry was started. The older machines including the washing machines,

hydro extractor, drying tumbler and sluicing machine have been replaced periodically with a life span of 10 years.

9. Laundering process: The Laundry works in two shifts from 8 am to 2pm and 2pm to 8 pm. Laundry remains closed on Sunday and on gazette holidays. The Washing time is 45 minutes, Hydro extraction timing is 15 minutes and drying timing is 30 minutes per cycle.
10. Logistic supply

- Washing materials are being supplied on a monthly indent from the central (non medical) store. The requirement is sent to the store 15 days prior and the indent is received from the store.
- Average demand is as follows:

List of Equipments

S. No.	Name of Equipment	Capacity	Quantity
1.	Washing machine	100 kg	1
2.	Washing machine	75 kg	4
3.	Hydro extractor	50 kg	6
4.	Drying tumbler	50 kg	10
5.	Calendaring machine/ air compressor machine	-	1
6.	Steam flat bed press	-	1
7.	Ironing press	-	1
8.	Trolley	-	20
9.	Tailoring machine	-	1
10.	Boiler	-	2
11.	Water Softening Plant	10000 Ltr	1

	Monthly	Daily
Soaps Chips	270 kg	9 kg
Soda Ash	540 kg	18 kg
Bleaching powder	90 kg	3 kg
Blue	30 kg	1 kg
Ranipal	15 kg	500 gm
surf	20 kg (Only for wooden)	

The material is purchased by the central store as per the demand from the laundry. There is quarterly purchase of the material by central store.

Costing

The approximate cost incurred in washing the clothes is calculated based on several parameters Monthly expenditure.

1. Salaries and wages Rs. 6,86,000
2. Cost of washing material- soap chips Rs. 7,500

Soda ash	Rs. 16,000
Blue	Rs. 5,000
Bleach	Rs. 1,000
Ranipal	Rs. 2,500
Total cost	Rs. 32,000

3. Monthly maintenance 22,60,000/12 Rs. 1,83,000
4. Cost of light diesel oil (LDO) Rs. 8,86,400

Total expenditure incurred per month is Rs. 17,87,400

Total weight of clothes washed in a month (kg) 45000

Cost of washing one kg of cloth is Rs. 39.72

Note- Besides there is additional costs of liner procurement, linen replacement, hidden costs, water and electricity which are borne by the CPWD and could not be accounted above**.**

Constraints

On inspection of the laundry and after discussing with the staff certain problem areas were identified. The most obvious fact and what the staff feels most is that in comparison to the other departments, hospital administration has not given enough importance to the laundry and linen supply.

It is very obvious with the issues like

- The material is not available in time and whatever

material is purchased is not adequate for overcoming the demands.

- The laundry is supposed to open at 8am but the working only starts after 9 am. The manpower employed in the laundry often takes break thus delaying the process.
- Space constrain is an important problem. Though there is enough space for expansion but still there is no space to store the blocked linen or the linen, which needs condemnation.
- The condemnation process is delayed and the laundry is not given due importance for the same.
- The cost incurred is very high but the authorities have advocated no cost control measures so far.
- A lot of pilferage takes place because of the lack of adequate supervision, with the laundry workers putting in less than the required material for washing and washing their personal clothes along with the hospital clothes.
- Also a lot of damage is taking place due to the recently employed machines which are substandard and the percentage of the damage to the clothes has increased from 5% to almost 95%.
- There are certain items that are blocked per month. For these items there is no system or storage, disposal or recuperation. There is no provision for the retrieval of these clothes and the accountability comes directly on the manager.

Critical Appraisal

- Cost of washing is the most critical issue for this laundry. The cost incurred by the hospital is Rs. 39.72 per cloth. This is very high compared to normal domestic laundry service of about Rs. 10-12. Possible reasons for this high cost could be:

❖ Lack of professional training of the staff regarding operation of laundry machines again reduces productivity and need for more staff.

❖ Frequent break down of machinery decreases output.

❖ The machines are responsible for a lot of wear and tear in the clothes.

- The frequent breakdown of machinery is another important issue in itself and also in terms of increasing the cost. The annual maintenance / repair expenditure of the machines is Rs. 22,60,00.
- The frequent un-serviceability of equipment could also be due to ignorance in handling the equipment. The laundry operators need to be properly trained in handling the equipment.
- Solid, infected, routed linen is not received in different bags from the wards. This mixing of linen is a serious threat to the health of the laundry workers, who will be handling the linen without being extra cautious as to what they are handling.
- The linen is not being weighed before washing. In fact overall only 8 cycles of one washing machine is being used and in which about half is water and the total clothes are much more. So the machines are being overburdened in each wash.
- Though the laundry is costing almost triple but the final quality of wash is still compromised. The staff employed in the laundry services does not use protective clothes while washing and also no hygiene is maintained while taking out the washed and dried clothes from the machines
- The laundry premises are not neat. The area has is not properly fumigated. This in spite of the fact that laundry receives a lot of infectious wastes.
- Condemnation board for laundry is being carried out almost once a year. The condemnation board should be held once in six months. In the mechanized laundry the life of cloth is further reduced.
- The clothes that are sent for repair are not washed and directly packed after repair.
- There has not been any regular immunizatiuons/ health check up of the laundry workers.
- The woolens are washed but there should be provision for dry cleaning of these items.
- The storage area in the folding room does not have cover so the washed clothes are exposed to dust etc.
- The LDO that has to be procured for the laundry operations has to be done by the laundry supervisor himself, for which he has to visit the IOC office with the request for clearance of the demand. It wastes precious time and also uses up the manpower, which could have been put for different use.

Recommendations

- First and foremost a committee should be formed, including a microbiologist and a surgeon. There should be quality check and control.
- The working of the laundry should be better supervised with the workers asking to come on time so that the process is started and finished on time.

- Reduction of the cost is an important issue for the laundry. This can be managed by the following options:

❖ Proper and complete utilization of the equipments

❖ Proper training of the staff for operating the machines. This will reduce the cost incurred on the maintenance.

❖ The hospital laundry can be staffed and expanded and it can start catering to the laundry needs of the small hospitals in the vicinity of course after things are settled at higher level.

❖ The cost can be cut on the total linen purchase by provision of the clothes returned to the department on the same day. Therefore the total linen required can be reduced and thereby the total cast of laundry can be indirectly reduced.

❖ The clothes should be properly weighed before putting in the washing machine so that some saving can be done on the electricity.

❖ The DO's and DON'T's for the equipment should be clearly written and pasted in the working area so that the maintenance cost can be cut down.

❖ If there is lack of adequate linen for change then first and foremost new linen should be purchased and if the staff is not efficient it should be tackled.

- The laundry should be expanded to provide more storage area.
- Any cloth that leaves or breaks the cycle in between should go back to the first step that is the sorting area. Especially the clothes from the tailor room should not be coming back to distribution counter directly.
- The immunization schedule should be implemented for the laundry workers on regular basis especially for hepatitis B and C. The DoH guidelines also include the guidelines for health check and immunization.
- The laundry staff should be educated about infection control policies.
- The area should be fumigated as this is most often exposed to all kind of infections through linen.
- The clothes should be sorted prior to reaching the laundry i.e. from the wards they should be collected in separate bags or all the linen should be treated as infectious linen. Preferably the infectious clothes should be soaked in bleach in the wards.
- There should be some permissible number of items that the laundry manager should have the authority to dispose or condemn as some pilferage and some blocked items cannot be avoided.

Scope of Outsourcing the Laundry Services

The outsourcing of the laundry services is a very difficult issue to debate on. There are various factors which are supposed to be considered while resolving this issue.

The factors which must be kept in mind include:

1. An Inplant system of laundry already exists in the hospital.
2. There is already linen in sufficient quantity for serving the hospital needs.
3. What to do with the manpower which is already employed for this service.

The procedure of outsourcing the laundry is already under review of the administration. There conditions being that they will provide laundry services for a price of Rs 23/kg of linen, but they would use CNG for their operational services. Also they will use the space of the laundry, free of cost and require sufficient amount of electricity and water supply from the hospital. The machines that they would bring for use will be imported and latest and they will replace the existing machines.

The costing that is being provided by the private company cannot be compared at present, as the cost being calculated in this study using LDO, but the company is employing CNG as its fuel, hence different calculations have to be done using the CNG as the fuel.

Though the cost per unit of cloth is coming very high i.e. Rs 39.72/- still we can employ measures to cut cost. The main problem is the LDO fuel that is being used. If it can be changed with the CNG fuel then the cost can be cut down tremendously. Hence we can see that the cost can be tremendously reduced if the CNG is used as the fuel. This will also help in retaining the manpower that has already been employed for this service.

The only aspect which can be considered in favoring the outsourcing is the administrative convenience that will be there. The time and effort that are being employed by the administration is of a high amount. Also the attitude of the workers is of a casual nature, maybe due to the job security provided by the government, due to which the efficiency of work is reduced. Outsourcing will also ensure decrease in pilferage costs to the hospital.

The requirements of a good laundry in the hospital include the fact that there should be a continuous supply, good quality of the service and the last is cost.

As the continuous supply is such an important factor the company with which the outsourcing has to be done, it should be ensured that an appropriate contract is designed such that there should be enough penalties to ensure that the company does not falter in providing clean linen to the hospital on time.

As far as this study and my observations are concerned, the authors recommend that there should be a change of the fuel from LDO to CNG. This would ensure that not only the continuous supply is continued but the costing is also reduced.

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Original Article

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Nurse's and Patient's Perception of Nurse Caring Behaviors in Cardio Thoracic Setting

Ramya K.R.[1], Havilah Elizabeth Kurian[2]

Abstract

Caring is the essential element of nursing. It maintains human dignity in health care systems as a moral principle and measure of intervention and treatment. In other words, a high quality caring is the right of all patients and a responsibility of all caregiver nurses. As patients are the recipients of care, it is important to identify their perceptions of caring. This was a descriptive, comparative, cross-sectional study to examine the relationships between patient's perceptions of nurse caring behaviors and nurse's perceptions of nurse caring behaviors in cardiothoracic setting. Data was collected using 24-item caring behaviors inventory from twenty eight nurse - patient dyads.

Findings showed that, no significant differences exist in patient's and nurse's perceptions of nurse caring behaviors. Patients rated assurance dimension as highest while nurses rated knowledge-skill dimension as highest. Both patients and nurses rated connectedness dimension as lowest. The results are useful in their own and in similar settings because they can be used by staff nurses to improve nursing care by refining the way they provide care to patients, and encourage nurses to ask patients about their expectations of care while in the hospital.

Keywords: Caring; Nurse Caring; Caring Behaviors; Patient Perspective.

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Introduction

Human caring is seen as the origin and essence of nursing. Caring is the dominant intellectual, theoretical, heuristic, and central practice focus of nursing. No other profession is so totally concerned with caring behaviors, caring processes, and caring relationships than nursing [1]. As yet, no universal definition or conceptualization of caring exists, but several have been put forward. According to Watson, it maintains human dignity in health care systems as a moral principle, and measure of intervention and treatment [2]. In other words, a high quality caring is the right of all patients and a responsibility of all caregiver nurses [3]. Nurse caring is an interactive and interpersonal process occurring in moments of caring between nurse and patient.

It is the patient's perceptions of nurse caring behaviors that can have a significant impact on patient outcomes and patient satisfaction [4]. Basically, there can be no cure without care, while there is caring without cure. While caring behaviours foster the spiritual freedom and enhance growth and development, noncaring behaviours make patients feel prostrated, isolated, afraid, and helpless [5]. Green and Davis showed a positive correlation between patient perceptions of nurse caring behaviours and patient satisfaction. If patients perceive a number of nursing activities as caring behaviours, patients may feel more confident and empowered, and this will help them gain control and independence. Previous studies have also showed a significant correlation between patient reports of nurse caring and their satisfaction with nurse curing

[6]. Caring behaviours also benefit nurses at the social level by increasing their relationships with clients and by enhancing their sense of personal and professional satisfaction and love for nursing [7].

Declining quality of hospital care is of great concern to patients and health workers alike. Demands on bedside nurses have never been greater as they struggle with competing time demands and priorities to enhance the patient experience. Patient's perceptions of how they want to be cared for is reflected in many studies on quality of care [8]. Without conscious attention to the development of the caring relationship, the patient experience can be negatively affected. Identifying the behaviors that patients perceive as caring can help nurses design interventions that are patient centric, predicated on evidence and contribute to the overall patient experience.

It is therefore, of the utmost importance to know how patients perceive hospital nursing care because nursing care is the single most significant factor in the patient's perception of high-quality hospital care [9]. It is also equally important to understand any differences in the perception of caring behaviors between nurses and patients to close the gaps. Caring for patients and meeting their needs is especially challenging for nurses working in cardiothoracic units as they require to quickly treat patients, minimize pain and suffering, and protect life. Hence the present study was undertaken to know the differences in caring behaviours between patients and nurses perspective in cardiothoracic setting.

Materials and Methods

The present study utilized a quantitative approach and a cross sectional descriptive-comparative design to compare the views of patients and nursing staff on nurse caring behaviours. A total of 28 diads were participated in the study. The population was defined as adult patients who received service in the cardiothoracic wards of the selected tertiary care hospital, South India.

The sample was a nonprobability convenience sample of adult patients (18 years or older) who received care in the cardiothoracic wards during a 1-month period and were discharged from the unit without being admitted to another hospital unit. Patients admitted to other hospital units were excluded to avoid influence from care received at other units. Those who were critically ill, not willing to participate and can't respond adequately to the questionnaire were excluded.

Because dyads were compared, and if a patient agreed to participate in the study, the nurse caring for the patient also had to be enrolled in the study. If the nurse had not already completed the study documents and wished to participate, the nurse was enrolled. Those who were consented, and completed the study instruments the day of data collection. If the nurse declined, the patient was not enrolled.

Nurses' perceptions of nurse caring behaviors and patients' perceptions of nurse caring behaviors were measured using the Caring Behaviors Inventory (CBI) that was developed by Wolf in 1981. The permission to use the tool was also obtained. It remains one of the most widely used instruments to measure nurse caring and was selected due to its conceptual similarity to the theory of human caring and Watson's ten carative factors. The CBI has 4 subscales including Assurance (8 items), Knowledge and Skill (5 items), Respectful (6 items), and Connectedness (5 items). The inventory has 24 items and is evaluated on a 6-point Likert type scale (1=never, 2=almost never, 3=sometimes, 4=usually, 5=often, 6=always). The total score was calculated by adding up all the scores obtained from 24 items. For each subscale, the items in each subscale are added up, and the total score was divided into the number of items, which yields subscale scores that range between 1 and 6. Evaluation of the scale was done according to the total scores; thus, low scores indicate low perception of care and high scores indicate high perception of care. Minimum and maximum scores CBI were 24 and 144, respectively. Data collection was conducted in the month of June 2017. Validity and reliability was ensued before data collection. Furthermore, internal consistency was used to determine the reliability of CBI; therefore, Cronbach's alpha coefficient was calculated after colleting data from 20 patients of admitted in cardiothoracic wards. These samples were excluded from the main study.

Descriptive data on the nurses' demographic data instrument included the nurse's age, gender, marital status, highest level of education, number of years working as a nurse and number of years working in the current area. Descriptive data on the patients' demographic sheet included the patient's age, gender, marital status, highest level of education, and previous visit to the hospital.

Data were analyzed using Statistical Package for the Social Sciences (SPSS), version 20 software for Windows. Descriptive statistics were computed on the sample characteristics and study variables in the form of frequencies, means, standard deviations, and percentages to best characterize the sample. If the score distribution of a continuous variable was

significantly non-normal, transformation of the data was considered. Following descriptive summary of the data, inferential analyses (independent t- test) were employed to answer the research question posed by this study to explore the relationships between patients' perceptions of nurse caring behaviors, nurses' perceptions of nurse caring behaviors.

Ethical Considerations

Permission to conduct the study was obtained the authorities. Provisions for the protection of human subjects in this study were maintained throughout the course of the investigation. They were informed that there were no risks for participating in this research beyond those experienced in everyday life. Participation in the research was completely voluntary, free of coercion and at no cost to the participant as described in the informed consent. Written informed consent was obtained from each participant by the researcher after the participant had time to consider the risks and benefits of participating in the research. The researcher verbally explained the process and provided an opportunity for participants to ask appropriate questions. Research participants, whether they were nurses or patients, were assured of their protection during the Informed Consent process.

Results & Discussion

Socio-demographic features of the patients were analysed. Results showed that 79.2% of the participants were male, 83.3% were married, aged between 19 and 71 (44.63 ±16.7) years. Of all, 33.3% (n=169) were graduated and 29.2% each were educated up to primary and up to secondary school. Out of all 54.2% of them had history of previous hospitalization in the present hospital. Analysis of the socio-demographic features of the nurses showed that 79.2% were female, 66.7% (n=32) were married and 41.7% had diploma in nursing. Average age of the participants was 27.1yrs (range: 22-33).The total years of experience in the present institution was 3.17±0.58, while that of total professional experience was 4.17±2.44yrs.

Table 1 show the differences between nurse's and patient's perceptions about nurse caring behaviours. Patients rated assurance dimension as highest while nurses rated knowledge-skill dimension as highest. Both patients and nurses rated connectedness dimension as lowest. In contrast to the present study findings, previous research on patient perceptions of caring behaviors indicated that nurse's 'professional knowledge and skills' were rated as the most important caring behavior by patients [10,11]. When comparing the perceptions of nurses and family members of patients O'Connell and Landers reported that the top five caring behaviors reported by relatives in descending order were, 'treat the patient as an individual', 'know what you are doing', 'know how to give injections, IVs, etc.', 'know how to handle equipment and give the patient medications and treatments on time' [12]. The lower mean score for positive connectedness had been reported by Chang, E et al [13]. Nurses have to spend more time with patients and listen to them while nurses have understood that listening to patients was the best caring behaviour [14]. Teng CI et al suggested that nurses have to provide care consciously and conscious attention to the patients leads to trust [15].

The present study findings revealed no significant difference in the in patient's and nurse's perceptions of nurse caring behaviors. Few studies have shown that nurse caring behaviors have been perceived similarly [16], but many studies have demonstrated significant differences in patient's and nurse's perceptions of nurse caring behaviors [17,18].

Table 2 shows the patients and nurses perception of caring behaviours scores obtained from CBI-24. In the assurance sub-scale, "showing concern for the patient" was ranked most important by nurses, while 'Encouraging the patient to call if there are problems and giving the patient's treatments and medications on time' by patients. In the respectful deference to others sub-scale, 'being empathetic or identifying with the patient was rated most important by the patient and "Treating the patient as an individual' by nurses. As for the positive connectedness sub-scale, 'Giving instructions or teaching the patient' was found to be the most important item for both patients and nurses. Though the 'managing equipment skillfully' was most important in knowledge-skill subscale for patients, nurses considered 'being confident with the patient' as most important.

Limitations

This study was limited to (1) patients who received service in cardiothoracic units of one department and nurses at a single site, (2) a convenience sampling was used which limits the generalisability of the findings, (3) the use of a measurement error could occur as a result of the different ways of administering the CBI scale.

Table 1: Comparison of the CBI-24 subscales and total mean scores of nurses and patients

Caring Behaviour Inventory	Nurses Mean ± SD	Rating	Patients Mean ± SD	Rating	t-value	p
Assurance	5.41±0.456	1	5.52±0.655	2	0.664	0.510[ns]
Knowledge -Skill	5.35±0.468	3	5.59±0.571	1	1.326	0.191[ns]
Respectful	5.36±0.416	2	5.42±0.745	3	0.318	0.752[ns]
Connectedness	5.11±0.523	4	5.19±1.067	4	0.309	0.59[ns]
Total	5.3±0.404	-	5.42±0.691	-	0.667	0.508[ns]

ns Not Significant

Table 2: Distribution of the scores obtained from CBI-24 of nurses and patients

Caring Behaviours Inventory		Nurses Mean ± SD	Min-Max	Rating	Patients Mean ± SD	Min-Max	Rating
Assurance	Returning to the patient voluntarily	5.13±0.85	4-6	12	5.21 ±1.474	1-6	13
	Talking with the patient	5.33±0.702	4-6	7	5.33 ±1.129	2-6	10
	Encouraging the patient to call if there are problems	5.38±0.711	4-6	6	5.71 ±0.751	3-6	3
	Responding quickly to the patient's call	5.46±0.721	4-6	4	5.46 ±1.179	1-6	7
	Helping to reduce the patient's pain	5.54±0.658	4-6	3	5.54±1.141	1-6	5
	Showing concern for the patient	5.58±0.584	4-6	1	5.54 ±1.103	1-6	5
	Giving the patient's treatments and medications on time	5.57±0.654	4-6	2	5.71 ±0.751	3-6	3
	Relieving the patient's symptoms	5.29±0.751	4-6	8	5.67 ±0.671	3-6	4
Knowledge -Skill	Knowing how to give shots. IVs, etc.	5.29±0.806	3-6	8	5.67 ±1.007	2-6	4
	Being confident with the patient	5.54±0.658	4-6	3	5.71 ±0.69	3-6	3
	Demonstrating professional knowledge and skill	5.25±0.608	4-6	9	5.38 ±1.056	2-6	9
	Managing equipment skilfully	5.29±0.624	4-6	8	5.79 ±0.415	5-6	1
	Treating patient information confidentially	5.42±0.584	4-6	5	5.25 ±1.032	3-6	12
Respectful	Attentively listening to the patient	5.33±0.637	4-6	7	5.42±1.213	1-6	8
	Treating the patient as an individual	5.54±0.588	4-6	3	5.29±1.122	3-6	11
	Supporting the patient	5.42±0.717	4-6	5	5.38±1.013	3-6	9
	Being empathetic or identifying with the patient	5.42±0.776	4-6	5	5.75±0.737	3-6	2
	Allowing the patient to express feelings about his or her disease and treatment	5.17±0.816	4-6	11	5.17±1.341	1-6	14
	Meeting the patient's stated and unstated needs	5.29±0.624	4-6	8	5.5±1.42	1-6	6
Connectedness	Giving instructions or teaching the patient	5.38±0.647	4-6	6	5.67±0.637	4-6	4
	Spending time with the patient	5.17±0.637	4-6	11	5.08 ±1.55	1-6	15
	Helping the patient grow	4.92±0.929	3-6	13	5.0±1.474	1-6	17
	Being patient or tireless with the patient	5.21±0.779	4-6	10	5.17±1.523	1-6	14
	Including the patient in planning his or her care	4.92±0.776	3-6	13	5.04±1.546	1-6	16

Implications and Recommendations

The results are useful in their own and in similar settings because they can be used by staff nurses to improve nursing care by refining the way they provide care to patients and encourage nurses to ask patients about their expectations of care while in the hospital. If nurses prioritize their caring behaviour the way patients perceive as important, patients may

feel more confident and empowered, and this will help them gain control and independence. Nurse administrators can also be encouraged exploration of what patients consider important with regard to high quality care. Educational programs may also be developed that highlight the caring expectations of patients. It is also paramount that nurse administrators help nurses, especially the newly employed ones, to develop their competencies and advance their knowledge through continuing education programmes. Nurse administrators could also conduct seminars in which nursing staff discuss newly published articles about caring.

It is recommended that future research focus on more extensive interviews over a period of the patient's hospitalizations in order to capture a more complete view of the patient's experience with hospitalization and care. Because nursing care and caring behaviours can best be researched using qualitative approaches, it is recommended to use qualitative methods to measure individual differences in patient's perceptions of care and caring behaviours. The need for further studies of caring behaviours among patients in private hospitals, government hospitals or specialty hospital is necessary.

Conclusion

Caring is the essential element of nursing. As patients are the recipients of care, it is important to identify their perceptions of caring. Nurses are the caregivers who render the most direct care and have the most contact with patients while they are hospitalized. When patients are hospitalized, they have expectations about the care they will receive. Understanding what patients perceive as caring behaviors is essential in tailoring nursing interventions that meet individual patient needs and impact the patient experience.

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Original Article

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Occupational Risk amongst the Police Personnel in a State of India: Vulnerabilities and Challenges

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Abstract

Police personnel had to perform overtime and shift work, suffer from disrupted sleep patterns, stress and may have high rates of tobacco and alcohol consumption than the general population forced to live physically inactive lifestyle, have irregular diet while on duty raising serious risk to their health. A study was conducted in Gaziabad District of Uttar Pradesh among to assess the lifestyle pattern with respect to dietary habit, physical activity and their knowledge, attitude and practices regarding non communicable diseases amongst the randomly selected 100 police personnel of Uttar Pradesh Provincial Armed Constabulary. Study found prevalence of high rates of hypertension (34.7%) and Diabetes (15.8%) were found among them. It was found that the daily vegetable, fruits intake in the personnel was less than five servings was seen among 74.3%. According to the analysis 71.9% of the police personnel were not doing the recommended 150 minutes of physical exercise in a week. According to the analysis 68.5% were either over weight/obese. The unfavorable trends for most major risk factors pose an enormous challenge and call for additional and timely action and policies, especially those of a legislative and regulatory nature and those providing cost-effective chronic care for individuals affected by NCDs.

Recommendations: Orientation during induction training of police personnel regarding reduction in alcohol use, increase in fruit servings along with other lifestyle modification measures may help in prevention and control of hypertension and other NCDS. Policemen also require periodic counseling and medical examination to remain healthy.

Government to budget for private gymnasium memberships for officers and constables or build fitness stations within an area of the police department. The Police Departments may evolve wellness programme offer incentives, such as additional vacation days, for officers who pass a rigorous wellness test and may also to link fitness for next promotion.

There is a need for nationwide multi-centric studies to be conducted on the prevalence of diabetes and its complications amongst the police personnel.

Keywords: CHD; KAP; NCD; NHM; NFHS.

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Introduction

The Non-communicable diseases (NCDs) are emerging as the major cause of death and disability worldwide. Having risk factors such as tobacco use, high serum cholesterol, inadequate intake of fruits and vegetables, excess weight, physical inactivity, unhealthy diet and the harmful use of alcohol and some medical conditions such as hypertension and diabetes increases the risk of development of NCDs [1,2,3]. Risk operates in continuum with adverse events in persons with modest elevation of many risk factors, having a multiplicative effect [3]. NCDs, especially

cardiovascular disease, diabetes mellitus, and stroke have emerged as a major public-health problem in India [4].

The police personnel provide continuous service and have to serve round the clock. The increasing rate and complexity of crime particularly of an organized nature and violence, agitations, violent demonstrations, variety of political activities, enforcement of economic and social legislations, etc. have further added new dimensions to the responsibilities of police personnel.

Given the fact that policemen lead a physically inactive life, have irregular diet and limited choice of food while on duty, take overtime and shift work, suffer from disrupted sleep patterns, stress and have high rates of tobacco and alcohol consumption than the general population. Police officers have an even higher prevalence of overweight and obesity and other cardiovascular risk factors. Police officers face many stressors like chronic exposure to critical incident stressors as well as routine occupational and organizational stressors, such as high responsibility, contact with criminals, heavy work load, irregular duty hours and others that may adversely affect sleep quality and health [5,6].

Police officers are engaged in physical challenges on a regular basis. For example, they chase fleeing suspects; they climb over fences and onto roof tops; they subdue resisting arrestees; and they lift heavy objects such as recovered stolen property. These often daily job requirements require strength and endurance that is obtained by a combination of aerobic and anaerobic exercises. Adding to this physical challenge is the fact that officers must carry bulky items of additional weight on a pistol belt: handgun, baton, and handcuffs.

Occupational stress is a major concern among police officers. Police work is one of the most stressful occupations in the world due to their enormous stresses, uncertainty in work, lack of support from the superiors etc. They are suffering from different types of physical and mental disorders. Police officers often attribute their above average cardiovascular disease risk due to improper scheduling of shift, job-related stress, and poor dietary habits while working.They have been found to have an increased prevalence of CVD risk factors and type 2 diabetes than any other occupational group and amongst the general population in many countries [7-14].

In India, epidemiological studies have been done extensively for prevalence of diabetes and other non communicable diseases like hypertension among the armed forces [7]. However, there is dearth of epidemiological data on the Lifestyle pattern among police and armed personnel. Fitness/wellness of police officers has been the focus of not many studies. A study has found that police officers suffer from different types of psychological stressors. Lack of force, killing someone in the line duty, shooting incident and shift work were most stressful stressors of the police officers. They remain exposed to traumatic stressors, including physical injury, witnessing death or injuries to other officers and civilians in duty hours. The impact of this high rate of exposure on health has long been a significant public health concern [15]. Another study has reported that police officers often are overly fatigued because of shift work, insufficient sleep and long and erratic work hours. Long work hours and shift work severely stresses on the health and performance of police officers. These factors likely contribute to the elevated levels of morbidity and mortality, lack of physical activity and family disharmony observed among police [16].

It is found that only few studies among police personnel have been carried out in India. Therefore, it is important to study the relationships amongst occupational stress, obesity, and dietary habits. The present study was conducted to assess the lifestyle pattern with respect to dietary habit, physical activity and their knowledge, attitude and practices regarding non communicable diseases amongst the police personnel of Uttar Pradesh Provincial Armed Constabulary working with the 41st Battalion under the jurisdiction of the Director General of Police, Uttar Pradesh.

Material and Methods

The present research was a descriptive study conducted amongst randomly selected sample of 100 personnel aged between 21 and 60 years age from 41st battalion of the Uttar Pradesh Provincial Armed Constabulary in the district Ghaziabad during March-April 2016. The data for this study was collected on voluntary basis using a pre-tested Structured Questionnaire. The Researcher was present to explain how to complete the questionnaire. Fruit and vegetable intake was measured using the standard serving size according to the NIN guidelines. Physical measurement of the respondents was done using scientific instruments as per the metric scale. Data was analyzed with the SPSS 23.0 and findings generated as per objectives.

Operational Definitions

The term **"life style related disease"** is sometimes used to emphasize the contribution of behaviour towards development of chronic diseases. In fact these diseases are heavily influenced by environmental conditions and are not the result of individual choices alone. The most common causes for non-communicable diseases (NCD) include tobacco use (smoking), alcohol abuse, poor diet (high consumption of sugar, salt, saturated fats, and trans fatty acids) and physical inactivity.

Serving Size

In this study a serving size is a standardized way of measuring food based on nutritional needs and can be very different from the portion size or amount of food served. A standard serving size is taken as 80g. According to WHO Guidelines a person must have 400 g or at least 5 servings of fruits and vegetables in a day.

Body Mass Index

BMI is a number calculated by dividing a person's weight in kilograms by his or her height in meters squared. BMI is used in determining obesity. As per the guidelines issued by the Ministry of Health & Family Welfareand the Indian Council of Medical Research released (in 2012) a BMI over 23 kg/m2 is considered overweight.

Physical Activity

In this study the term "physical activity" includes exercise as well as other activities which involve bodily movement and are done as part of playing, working, active transportation, house chores and recreational activities. The Recommended levels of physical activity (WHO, 2015) for adults aged 18 - 64 years is at least *150 minutes (2 hours and 30 minutes)* a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity.

Limitations of the Study

Ideally this study would have surveyed more officers in more police departments in India and globally. However, *time, resources* and *want of permissions* limited to the less sample size . There was a *recall bias* too as the participants were required to recollect their dietary intake and physical activity routine. In spite of encouraging the participants to give unbiased answers some kind of *information bias* also existed as the participants were hesitant in giving an account of their physical activity, number of breaks which they took etc. It took a lot of time and energy to convince them that this is only an academic activity and does not bear any effect on their working and to their organization.

Findings

Disease Profile

In our study, majority of the respondents were found to be in the age group of 40-45 years and the mean age was 40.5 years. Only 16.8% of respondents were not suffering from any form of chronic illness , the rest of 83.2% were suffering from some or the other form of illness, the most common being Hypertension (prevalent amongst 34.7% of the respondents) followed by Diabetes (15.8%) and other chronic illnesses (32.7%).

Knowledge

Our analysis 78.2% of the respondents had knowledge that taking meals at unscheduled times causes Obesity. Further, 65.3% of the personnel knew that consumption of fast foods like burgers, pizzas etc leads to obesity and 66.3% believed that there is an association between drinking aerated drinks like Coca-Cola and Pepsi leading to obesity. While, 28.7% of the respondents opined that fast food consumption increases in people who do shift duty.

Nutritional Profile

More than 80% were missing meals as against just nineteen percent who said they never missed a meal. On further analysis, it was found that nearly 33.7% of the respondents were missing their meals three times in a week, and 23.9% of the respondents were missing their meals five or more times as against just 19.7% who claimed to have never missed a meal. Analysing reasons, we found that nearly 92.1 percent of the respondents replied that their work timing was responsible for their altered meal timings.

According to the analysis 25.7% said they were taking more than five servings of fruits and vegetables on a daily basis while. 41.6% of the respondents were taking less than five serving of vegetables and fruits. According to the analysis 65.3% of the respondents said they were having two servings of fruit in a day while 17.8% said they were taking more than two servings. 16.8% of the respondents were taking only a single serving of fruit.

According to the analysis 52.5% of the respondents said they were having two servings of Dal (Pulses) in a day, while 19.8% said they were taking more than two servings. 27.7% of the respondents were taking only a single serving of Pulses. According to the Analysis 25.7% of the respondents said they were having five or more servings of fruits and vegetables in a day, while 74.3% said they were taking less than servings five servings of fruits and vegetables on a typical day.

Physical Activity

According to the analysis, most preferred activity among 77.2% during breaks was enjoying snacks of fast food items, followed by 37.6% to watch TV or read the newspaper. The least preferred was carrying out any form of physical activity for leisure, being done only by 8.9% of them.

However, on a typical day, almost 88.1% of the respondents take out time to perform some form of physical activity while only 11.9% did not perform any physical activity. Further analysis shows that most popular form of exercise was found to be Yoga (69.1 %) amongst the Provincial Armed Constabulary personnel followed by going for a walk (59.6%), Cycling (21.3%), heavy weightlifting (16%). Further, 60% of the respondents said that they did less than 150 minutes of physical activity in a day, 28.1 % said that they did more than 150 minutes while 11.9% said they never engaged in any form of physical activity.

According to the analysis 72.1% of the respondents were exercising daily. While only 27.9% said they were unable to exercise daily. It was found that higher percentage (48%) of people weighing less than 60kg were exercising for more than 150 minutes in a week while less (23%) percentage of people weighing more than 60kg were exercising for more than 150 minutes in a week.

Obesity

According to the Analysis only 31.5% of the respondents were found to be in the healthy range, 50.7% of the respondents were in the overweight category while 14.9% were in the obese category and 3% were in the severely obese category. According to the it was seen that the maximum number of overweight and obese individuals were in the age group of 41-50 years (31)% followed by 21% in the age group of 31 to 40 years. The highest number of healthy individuals were in the age group of 21-30 (14%) followed by 31-40 (10%). According to the analysis the mean BMI was found to be 26.67 which lies in the obese zone according to the MOHFW and ICMR guidelines as well as the international guidelines.

Discussion

There is no denying the fact that these uniformed personnel are the ones exposed to maximum work related risks that are not common to other professionals. But unfortunately only limited studies have been carried out on the health aspects of police officers in India.

According to the analysis, very high percentage (78.2%) of the respondents had knowledge that taking meals at unscheduled times causes many health problems. 65.3% of the personnel knew that consumption of fast foods like burgers, pizzas etc leads to obesity while 24.8% believed that consumption of such items does not lead to obesity which is quite disturbing. Only 28.7% of the respondents felt that fast food consumption increases in people who do shift duty. The respondents lacked the necessary knowledge. Our study found that 66.3% believed that there is an association between taking aerated drinks like Coca-Cola and Pepsi leading to obesity. This is positive sign for health and wellness among police officials. However, they could be further educated on eating healthy meals, as well as the nutritional value of various food items

Due to their occupational constraints police personnel could not follow fix schedule for having their lunch or dinner. Also, most of them were not provided with canteen facilities in major police stations neither were there separate rooms for lunch or dinner. Additionally, due to their frequent field duties many police personnel had to eat their food mostly in the vehicle in which they travel. Further 92% of the respondents believed that their work timing was responsible for their altered meal timings. These findings are similar to results published by Saha A. et al who reported it as 85.8% [17].

According to the analysis nearly 33.7% of the respondents were missing their meals three times in a week, and 23.9% of the respondents were missing their meals five or more times as against just 19.7% who claimed to have never missed a meal. This is much higher than a study conducted by the Illinois police [18] where just 18% of the police personnel were missing their meals three times in a week, and 13.9% of the respondents were missing their meals five or more times as against 79.7% who claimed to

have never missed a meal. In our study 81% were missing meals. This was also similar to a study done in Carmen Island police force [7] which found that 88 % of the traffic police were missing meals as a consequence of shift duty timings.

A report published by the Bureau of Police Research and Development (BRPD) and Administrative Staff College of India (ASCI) has found that 90% of police officers work for more than eight hours a day and 73% do not get a weekly off even once a month. They are often called into work on their rare holidays for emergency work. This is responsible for altered continuous fatigue and tendency to have irregular meal timings [2].

According to our analysis, 25.7% said they were taking more than five servings of fruits and vegetables on a daily basis while 41.6% of the respondents were taking less than five serving of vegetables and fruits. This is similar to Saha A. et al [17] who reported it as 28.8% and 42.7%. Further, 65.3% of the respondents said they were having two servings of fruit in a day, while 17.8% said they were taking more than two servings. 16.8% of the respondents were taking only a single serving of fruit. Moreover, 52.5% of the respondents said they were having two servings of Pulses in a day, while 19.8% said they were taking more than two servings. 27.7% of the respondents were taking only a single serving of Pulses. The WHO 2015 Guidelines state that a person must have 400 g or at least 5 servings of fruits and vegetables in a day for the diet to be considered adequate. However, a study conducted by the Chicago police found that 88% of the police personnel were taking the recommended levels of fruits in a day. Thus, in our study the intake of fruits and vegetables is falling short of the required amount as per the WHO guidelines [2].

The most preferred activity amongst the police personnel during breaks was found to be snacking on fast food items (77.2%). The least preferred was carrying out any form of physical activity (8.9%). This was also similar to a study by Adruend et al [20] which gives snacking on Samosa and Pakoras as the most preferred activity by 69% of the police personnel causing obesity and other health problems among them. In our study 55% police personnel were addicted to nicotine alcohol abuse. Since it was also found that 12.2% of the personnel preferred to smoke during their breaks.

Some studies found that police officers lead a physically inactive life, have irregular and hotel made diet and take spicy and limited choice of food while on duty, undertake overtime and shift work, suffer from sleeplessness, high rate of alcohol and tobacco consumption and stresses than the general people. They have been found to have an increased prevalence of cardiovascular risk factors than the general population [21]. Several studies have demonstrated that the lifestyle and working environment of the police is under constant stress with a high rate of binge eating, smoking and alcohol addiction [22,23].

This study found that 71.9% of the personnel were not exercising the recommended time on a weekly basis. The findings are not encouraging as only 31.5% of the respondents were found to be in the healthy range, 50.7% of the respondents were in the overweight category while 14.9% were in the obese category and 3% were in the severely obese category. This is much higher than study done by Abari John [24] according to which nearly 50% of police personnel of Greece were in the healthy range.

It was further seen in our study that the maximum number of overweight and obese individuals were in the age group of 41-50 years (31)% followed by 21% in the age group of 31 to 40 years. The highest number of healthy individuals were in the age group of 21-30 (14 %) followed by 31-40 (10%). This is comparative to study done by Saha et al [17] which found that the maximum number of unhealthy individuals (67%) were in the range of 31-50 years. This age group contained maximum number of personnel in the overweight/ Obese category, which is a major risk factor for many NCD's.

According to our analysis 60% of the respondents said that they did less than 150 minutes of physical activity in a day, 28.1% said that they did more than 150 minutes while 11.9% said they never engaged in any form of physical activity. It was also found that nearly 48% of people weighing less than 60kg were exercising for more than an 150 minutes in a day while only 23% people weighing more than 60kg were exercising for more than 150 minutes in a day. The extent of physical activity was much lower than the study done by the London Metropolitan Police [26] which stated that only 30% of the respondents were not doing the recommended levels of exercise. A study conducted in US found that officers' average fitness levels were below normal in the areas of aerobic fitness, body fat, and abdominal strength. Fitness levels were average in upper body strength and low back flexibility. Overall fitness of law enforcement officers in most areas of the US was less than that of 50 percent of Americans during this time period [8].

Several studies have demonstrated that the lifestyle and working environment of the police is under

constant stress with a high rate of smoking and alcohol addiction [11]. A study has reported that police officers often are overly fatigued because of shift work, insufficient sleep and long and erratic work hours which likely contribute to the elevated levels of morbidity and mortality, lack of physical activity and family disharmony observed among police [16].

Increased work stresses lead to heart attacks, headaches, and high blood pressure in police officers. Some study showed that police officers were suffering from abdominal pain, lack of appetite, and backache [18,25,27]. It has also been reported that some suffer increased rates of cardiovascular and metabolic disorders, divorce rates and suicide than the general population [25,26]. Some studies have also shown that the police officers are also exposed to chronic non-traumatic stress arising from the demands of their work environment. For example, police officers face pressures from supervisors, court, media, and the public that can increase the stress-related problems such as binge eating and insomnia [28].

Another study has found that police officers suffer from different types of psychological stressors. Lack of force, killing someone in the line duty, shooting incident and shift work were most stressful stressors of the police officers. They remain exposed to traumatic stressors, including physical injury, witnessing death or injuries to other officers and civilians in duty hours. The impact of this high rate of exposure on health has long been a significant public health concern [15].

In our study, diabetes was prevalent amongst 15.8% of the respondents which was found to be much higher than the current prevalence of the disease. The most likely cause for the high prevalence of the disease in our study population may be consumption of fast foods, irregular dietary habits, obesity, stressful environment and lack of physical exercise. Policemen require periodic medical examination and counseling to remain healthy.

Elevated blood pressure is a major risk factor for cardiovascular morbidity and mortality. The strenuous duties of police personnel can interact with their personal risk profiles, including elevated blood pressure, to precipitate acute cardiovascular events. Notably, the majority of incident of cardiovascular disease events occur among those who are initially pre hypertensive or only mildly hypertensive and whose average pre morbid blood pressures are in the range in which many physicians would hesitate to prescribe medications (140–146/88–92 [29]. The prevalence of hypertension was found to be 34.7% in police personnel in this study. This was comparatively more in studies done by Ramkrishan J et al [30] (30.5%), Sohi R et al [24] (9.97%) and Jahanvi G et al [31] (33%). The overall prevalence for hypertension in India is 29.8%.

A study conducted amongst Maharashtra Police in the age groups of 40-50 and found most of the policemen were complaining of musculoskeletal problems (62.7%), gastrointestinal problem (51.8%), and dental problems (41%). Prevalence of hypertension was 42.4%. 48% of policemen were pre obese while 20% obese in this study [25].

In US, a cohort study done on police force showed that this occupational group has high risk for development of non communicable diseases and cardiovascular disease (CVD) events at an earlier age and that they die much earlier compared to other groups [32]. Another study showed that heart rate of the police officers varies after getting some unavoidable or crucial news. Cardiovascular and haematological stresses are very acute in officers engaged in highway patrolling [33].

Conclusions

The police force faces pressures of many kinds during their jobs. Prevalence of high rates of hypertension (34.7%) and Diabetes (15.8%) were found among them. It was found that the daily vegetable, fruits intake in the personnel was less than five servings was seen among 74.3%. According to the analysis 71.9% of the police personnel were not doing the recommended 150 minutes of physical exercise in a week. According to the analysis 68.5% were either over weight/obese. Such findings will have adverse effect on their performance and also cost high medical expenditure on government exchequer.

The unfavorable trends for most major risk factors pose an enormous challenge and call for additional and timely action and policies, especially those of a legislative and regulatory nature and those providing cost-effective chronic care for individuals affected by NCDs.

Recommendations

Orientation during induction training of police personnel regarding reduction in alcohol use, increase in fruit servings along with other lifestyle modification measures may help in prevention and control of hypertension and other NCDS. Policemen also require periodic counseling and medical examination to remain healthy.

Government to budget for private gymnasium memberships for officers and constables or build fitness stations within an area of the police department. The Police Departments may evolve wellness programme offer incentives, such as additional vacation days, for officers who pass a rigorous wellness test and may also to link fitness for next promotion.

There is a need for nationwide multi-centric studies to be conducted on the prevalence of diabetes and its complications amongst the police personnel.

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Original Article

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Quality of Work Life and Its Associated Factors among Nurses Working in a Tertiary Care Hospital, South India

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Abstract

Background: Hospitals are complex organizations that provide services to the patients seven days a week, 24 hours a day. Doctors and nurses are the human resources that spend a significant part of their time at the hospitals. They have to do regular work and overnight duty in emergency situations, with an extensive workload and stress which can negatively affect their performance and quality of working life (QWL). The quality of service provided by the hospitals is of utmost importance for improving its in-patient rate. So in order to improve the quality of its service and organizational effectiveness hospitals must ensure high commitment from its patient-care personnel which is derived if they experience a sense of job satisfaction that is directly affected by their quality of work life. This study was an effort to assess the quality of work life of nurses in the selected hospital. *Materials and Methods:* This cross-sectional study was conducted among 85 nurses working in the selected tertiary care hospital recruited using simple random technique. The data-gathering instrument consisted of two parts. The first part consisted of questions on demographic information and the second part had questions on quality of work life. Data were analyzed using the SPSS 20 software. *Result:* The study revealed that the overall quality of work life of nurses in the selected hospital was 3.27±0.49.When dimension wise quality of life was analyzed, the quality of work context, co-workers, development opportunities work environment were found to be good while that quality of work life/ home life, work design, and work world were found to be poor. *Conclusion:* It is indisputable that quality of work life plays an important role in bringing job satisfaction in employees. This study has explored the factors that are important for quality of work life for employees in a hospital set up. These QWL factors are family needs of nurses, working hours, nursing staffing, and autonomy of practice, management and supervision, working environment, attitudes of public towards nursing, and salary factors.

Keywords: Quality of Work Life; Quality of Nursing Work Life; Job Satisfaction.

Introduction

Nurses are one of the most diverse and largest workforces in the health care system. The role of nurses in the health care system is expanding and changing. Their role is not just limited to institutional care but also involves delivery of services at various levels of the health care system. The word 'nurse' originated from Latin word 'Nutricius' which means someone who nourishes, fosters and protects. The nurses are one of the strongest pillars of the health care delivery system in providing safe, affordable, and quality services to the people [1]. They play a major role in maintaining health status and also in achieving the health related targets of the country. The various cadres in the health system make nurses an important health workforce from the community to higher levels in the health care delivery system.

Despite their vital role within the health care system, nurses remain as the invisible workforce of health care delivery system.

Today, nursing profession is facing numerous challenges. These challenges are causing major hurdles in the development of nursing profession. Shortage of trained nursing personnel in the health care system is one challenge which is a global concern [2]. There is lack of adequate number of trained nursing personnel in the health care delivery system, or an imbalance between the required number of nurses and actual availability of nurses on the ground. However, nursing shortage is more complex and multifaceted .This arises not only due to the inadequate number of qualified nurses but also due to the non-availability of nurses who are willing to work under the present conditions. Migration is also a major factor which is contributing to shortage [3]. Trained nurses are migrating to Western countries since they are offered better working conditions, recognition, and salary.

Quality of work life (QWL) is a complex entity influenced by, and interacting with, many aspects of work and personal life. Brooks argued that QWL has two goals; improving the quality of the work experience of employees and simultaneously improving the overall productivity of the organization. From a nursing perspective, Brooks defined the QWL as "the degree to which registered nurses are able to satisfy important personal needs through their experiences in their work organization while achieving the organization's goals". Therefore, the concept of employee satisfaction is about more than simply providing people with a job and a salary. It is about providing people with a place where they feel accepted, wanted, and appreciated. It has been argued that QWL influences the performance and commitment of employees in various industries, including health care organizations. A high QWL is essential to attract new employees and retain a workforce. Consequently, health organizations are seeking ways to address issues of recruitment and retention by achieving a high QWL. Focusing on improving QWL to increase the happiness and satisfaction of employees can result in many advantages for the employee, organization and consumers. These include strengthening organizational commitment, improving quality of care and increasing the productivity of both the individual and the organization [4]. According to Sirgy MJ et al, a happy employee is productive, dedicated and committed. On the other hand, failure to manage these factors can have a major impact on employee behavioral responses (for example, organizational identification, job satisfaction, job performance, turnover intention, organizational turnover and personal alienation) as well as outcomes of the organization [5].

Quality of nursing care is considered as an important aspect in evaluating the quality of health care. The quality of nursing and health care is directly interlinked to levels of job satisfaction among nurses and on the quality of nurse's work life. The rapidly changing health care environment has had an impact on the nursing work environment, workload and quality of nursing work life. Studies have shown that work environment has an impact on the patient outcomes and nursing work life [6]. Evidence shows that nursing shortage, poor quality of nurse's work life, job dissatisfaction and poor patient outcomes are directly linked to lack of healthy work environment [7].

Objectives

- Assess the quality of work life among nurses
- Identify the factors affecting quality of work life among nurses
- To find out the association between dimensions of quality of work life with selected Variables

Research Methodology

Approach & Design

The study utilized a quantitative approach and cross sectional survey design.

Study Site & Setting

The study was conducted in a 1250 bedded tertiary care hospital, Karnataka, South India.

Sample and Sampling Technique

A sample of 85 nurses' were selected using simple random sampling technique.

Inclusion & Exclusion Criteria

Nurses having more than 1 year of experience and who are willing to participate were recruited for the study. Those nurses who were not available during data collection and who were working in intensive or high dependency unit were excluded.

Tools and Techniques: A structured questionnaire was used to collect the data from participants. It had

4 questions on demographic information (gender, age, work experience, and mari-tal status) and 32 statements about nursing work life focusing on four dimensions; work life-home life, work design, work context, and work world. Each statement/question had a score rating from "1-5". The minimum score '1' being 'strongly disagree' and maximum score is '5' being 'strongly agree'. If the mean score of each dimension is more than three it was considered good. The total score of QWL survey ranged from 32-160. The QWL is divided in to low, moderate, and high according to the scores as shown in Table 1.

Ethical Considerations

An administrative permission was obtained from the selected hospital before data collection. Informed written consent was obtained from all participants. The purposes of the study were explained and they were assured of the confi-dentiality of their personal information.

Statistical Analysis

Completed questionnaires were sorted out and cleaned. Cross validation and consistency checks were done. Data were analyzed using the statistical package for so-cial sciences (SPSS) software. The collected data was analyzed in terms of percentage, frequency, mean and standard deviation based on the objectives of the study. Descriptive statistics were calculated and independent sample t- test was used to examine the relationship of quality of work life and mari-tal status, and gender. A p value of less than 0.05 was considered significant.

Results and Discussion

Characteristics of Study Participants

In total, 85 nurses participated in the survey. All nurses completed and returned the questionnaire. Majority of the participants belonged to the age group of 20-30 years (92.9%). The number of females participated in the study was 96.5% and 3.5% were accounted by males. Majority of the respondents (78.8%) had working experience of 1-2yrs followed by the 8.2% of the respondents had 4-8years of experience. Majority of the respondents (80%) were unmarried and the remaining was married.

Overall Quality of Work Life

In the present study, the overall quality of work life of nurses in the selected hospital was found to be is good with mean 3.27±0.49. Majority (80%) of participants were found to have moderately adequate and 18.82 % had high quality of work life. Moradi T et al revealed that 60% of nurses reported that they had moderate level of quality of working life while 37.1% and 2% had undesirable and good quality of working life, respectively [8].

Table 1: Scoring of Quality of Work Life

Dimension	Minimum Score	Maximum Score	Low	Moderate	High
Work life/home life Dimension	3	15	3-5	6-10	11-15
Work design Dimension	10	50	10-21	22-36	37-50
Work Context	16	18	16-35	36-59	60-80
Work World	3	15	3-5	6-10	11-15
Total Score	32	160	32-71	72-119	120-160

Table 2: Characteristics of study participants based on age, sex, work experience, and marital status

Variables	Category	Frequency (Percentage)
Age (Years)	20-30	79 (92.9)
	30-40	5 (5.9)
	40-50	1(1.2)
Gender	Male	3(3.5)
	Female	82(96.5)
Work experience	1-2	67(78.8)
	2-3	7(8.2)
	3-4	4(4.7)
	>4	7(8.2)
Marital Status	Married	17(20)
	Unmarried	68(80)

Quality of Work Life/Home Life

The mean value of quality of work/home life dimension was 2.92±0.70. Majority 68.23% of participants had moderately adequate and 23.52% had high quality of work life/home life. From Table 6 it is clear that they were not able to balance the work and family needs and the system of working hours negatively affects their life. This could be because they spend a long time at their workplace, so they have little energy after work and cannot fulfill their families' needs. Also rotating shifts mainly affect the life especially married nurses found it very difficult to balance between work and the family needs after exhaustion from work. Healy CM have supported the above findings in a study conducted among nurses. They revealed that many of the participants expressed their stress, work conditions, such as staff shortage, unsupportive management, and inability to balance work with their family needs. They also agreed that rotating shifts negatively affected their lives [9]. Khani A et al reported that nurses were incapable of balancing between the work-home lives and were dissatisfied in their job. Findings from Fletcher CE's study showed that shift duties, inadequate salaries, workload, lack of autonomy and career advancement opportunities are the main factors for poor quality of nursing work life and also result in job dissatisfaction [6].

Quality of Work Design

The study showed that the mean quality of work design was 2.92±0.54 and majority 87% of participants were found to have moderately adequate and 7.05% had low quality of work design. It is revealed from Table 6 that out of 10 factors that were negatively associated with quality of work life 5 were from the work design dimension.

Also, findings (Table 5 & 6) indicated that there was no enough number of nurses in the department, there were many interruptions during daily work routine, many non-nursing tasks were done by the nurses, there was no sufficient assistance from nursing assistants and service workers, work load wass too much to handle, and, also there was no enough time to do job. But they receive quality assistance from nursing assistants and service workers.

According to Eslamian J et al majority of the nurses believed that they had high workload, which is consistent with previous studies. On the other hand, 67.2% of the nurses believed they were not independent in taking care of the patients. About 88.7% of the nurses believed there were no adequate nursing personnel in their work environment and 64.5% believed that they were given extra non-nursing tasks. Shortage in human resources and increase of nurses' workload act as pressure factors among nurses, which lead to professional and organizational desertion. Despite the shortage in human resources, nurses are assigned to non-nursing tasks. These dimensions of mal utilization of nursing force can increase the shortage of nursing force in a vicious cycle and affect nurses' skills and experiences [10].

Mohamed WN suggested that nurses' shortage in Malaysia is strongly related to the work environment. The factors identified to solve nursing shortage in the present study were needs for communication, opportunities for career advancement and work and home life balance. They also suggested an effective work environment is essential to maintain the nursing workforce [11].

Quality of Work Context Dimension

The study showed that the mean quality of work context was 3.52±0.72 and majority 50.58% of participants were found to have high while 45.88% had moderately adequate quality of work context. It is revealed from Table 6 that out of 10 factors that were positively associated with quality of work context, were from the work context dimension. According to Said NB respect is a significant predictor for job satisfaction and has an impact on the work environment of the nurses showed that respect and recognition from the upper management or administration is essential for building trust, encouraging participatory decision making and communication between nurses improve their job satisfaction. He concluded that majority of nurses in the study reported that upper management did not pay attention to their issues and concern. Adequate supervision and interaction with the supervisors are considered as an extrinsic factor influencing job satisfaction [12]. Knox S et al also reported that favorable relationships with the supervisors are a key factor for the quality of work life [13].

Quality of Work World

The public image of nursing is diverse and incongruous. This image is partly self-created by nurses due to their invisibility and their lack of public discourse. The mean quality of work world was 2.57±0.78 and majority 68.23% of participants were found to have moderately adequate and 23.52% with high quality of work world. Further item wise analysis of dimensions revealed that the major factor

affecting quality of work life of nurses is salary and the financial benefits provided.

Disproportionate salary and reward was one of the reasons for nurses' dissatisfaction with their work life quality. Behavioral theories like Mallow and Herzberg behavioral theories showed that fulfillment of primary needs is essential as the individuals cannot concentrate on higher needs if their primary needs are not met. Mohammed WN et al found that, 93.5% of nurses believed that their salary was not balanced with the inflation rate in market. Nurses' low income is one of the major reasons for their job dissatisfaction and desertion [12]. Another study reported that the image of nurses was self-created by the nurses due to their invisibility and lack of public discourse. The factors which influence the nurses to improve their professional identity were public image, working environment, work values and educational and socio-cultural values. Registered nurses (RN) were regarded as assistants to doctors or helpers in the health care system [14]. Salary was one of the most significant reasons for young Finish nurses to leave the profession. Similar findings were reported by Fletcher also concluded that salary is major factor to cause job dissatisfaction. Quality of work life of nurses is

Table 3: Category wise distribution of Quality of work life score among nurses

Dimension	Low f (%)	Moderate f (%)	High f (%)
Work life/home life Dimension	7(8.23)	58(68.23)	20(23.52)
Work design Dimension	6(7.05)	74(87.05)	5(5.88)
Work Context	3(3.52)	39(45.88)	43(50.58)
Work World	7(8.23)	58(68.23)	20(23.52)
Total Score	1(1.17)	68(80)	16(18.82)

Table 4: Dimension wise quality of work life among nurses

Dimension	Minimum score	Maximum score	Mean ± SD
Work life/home life	3	14	2.92 ± 0.70
Work design Dimension	18	46	2.92 ± 0.54
Work Context	26	80	3.52 ± 0.72
Work World	4	14	2.57 ± 0.78
Total Score	70	144	3.27 ± 0.49

Table 5: Ten most common factors positively associated with quality of work life

Sl. No	Factors	Mean	SD
1.	There is teamwork	4.18	1.06
2.	Friendly atmosphere in the department	4.07	0.92
3.	Good communication with nursing in-charge	4.01	0.95
4.	There is good communication with other co-workers	4.0	0.91
5.	Good communication with physicians	3.97	1.07
6.	Able to provide quality patient care	3.96	0.96
7.	Nursing in-charge provides adequate supervision	3.74	1.04
8.	Hospital provides safe environment	3.71	1.14
9.	SOP'S facilitate the work	3.69	0.88
10.	Safety from personnel harm at work	3.63	1.03

Table 6: Ten most common factors negatively associated with quality of work life

Sl. No.	Factors	Mean	SD
1.	Enough nurses in the department	2.02	1.37
2.	Salary is adequate for my job	1.9	1.2
3.	Many non-nursing tasks are to be done	2.34	1.42
4.	Workload is too heavy	2.48	1.38
5.	System of working hours negatively affects life	2.62	1.16
6.	Enough time to do jobs	2.76	1.29
7.	Sufficient assistance from nursing assistants and service workers	2.85	1.34
8.	Many interruptions during daily work routine	2.89	1.16
9.	Society has a professional image of nurses	2.92	1.15
10.	Ability to balance work with family needs	2.97	1.14

Table 7: Association between dimensions of quality of work life with selected variables

Variable	Category	Low F (%)	Moderate F (%)	High F (%)	Test value	P value
Age	20-30yrs	1(1.3)	63(79.7)	15(19.0)	3.20	0.989 ns
	30-40yrs	0(0)	4(80)	1(20)		
	40-50yrs	0(0)	1(100)	0(0)		
Gender	Male	1(33.3)	1(33.3)	1(33.3)	28.52	0.001 **
	Female	0(0)	67(81.7)	15(18.3)		
Experience	1-2	0(0)	53(79)	14(20.9)	12.50	0.052
	2-3	1(14.3)	5(71.4)	1(14.3)		
	3-4	0(0)	4(100)	0(0)		
	>4	0(0)	6(85.7)	1(14.3)		
Marital status	Married	0(0)	12(70.6)	5(29.4)	1.751	0.417
	Unmarried	1(1.5)	56(82.4)	11(16.2)		

Chi-square/fishers excat test, ns not significant,** significant at 0.01 levels

influenced by the salary and financial benefits provided to them and are reported in numerous studies [15].

Association between dimensions of quality of work life with selected variables

From Table 7 it is clear that there exist a very strong association between gender and quality of work life(p=0.001). Age, years of experience, and marital status was not associated with quality of work life.

Recommendations

Nursing services is found to be the backbone of every hospital. It is one of the most important areas where patient care is concerned. So in order to provide highest quality of nursing services it is important to enhance the Quality of their work life.

- Management need to consider the family aspect of the registered nurses. Childcare facilities, convenient working hours, and sufficient vacations should be made available for nurses. These advantages will help nurses to balance work with their family requirements.
- More qualified registered nurses, sufficient and trained support personnel (that is, nursing assistants and service workers) as well as an equitable distribution of the current nursing workforce are needed to balance workload, and to ensure adequate nursing services for patients.
- Management and policy makers should encourage the professional growth of nurses through the provision of a systematic career ladder.
- Nursing department along with the media work for making the general public aware about the vital role of nurses in the care of the community, in the provision of health care services and in the advancement of the health of the population.
- The current salary system is a major challenge for nurses. The salary of nurses should be increased commensurate with the tasks performed.
- More social, managerial, professional and organizational support should be directed to young nurses who were found in this study to be less satisfied than experienced nurses. Older nurses may require strategies like sense of appreciation, valuation and respect.

Conclusion

Findings revealed that many areas of the work life of nurses require planned reform. These include the family needs of nurses, working hours, nursing staffing, autonomy of practice, management and supervision, working environment, attitudes of public towards nursing, and salary factors. Identifying and orienting the factor influencing the work life should assist the development of nurses. Effective strategies like Childcare facilities, convenient working hours, adequate salary and sufficient and trained support personnel, should be included to improve their QWL. What is positive in these findings is that the majority of respondents are personally satisfied to be in the nursing profession. It is contended that if other factors can be addressed, the hospital will attain an outstanding nursing workforce and, in turn, will ensure good quality of services provided.

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Review Article

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Nurses Responsibility in Handling & Identifying Suture Materials

Sheela J.[1], Malarvizhi S.[2], Amirthasanthi S.[1]

Abstract

Suture material is an artificial fiber used to keep wound together. Sutures are generally classified into four main categories absorbable or non-absorbable, monofilament or multifilament. The size of suture material is measured by its width or diameter and is vital to proper wound closure. Suture removal timings vary from 3 days to 21 days.

Keywords: Suture; Absorbale; Non-Absorbable; Monofilament; Multifilament and Suture Size.

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Introduction

Sutures are tiny threads, wire, or other material used to sew body tissue and skin together. They may be placed deep in the tissue and/or superficially to close a wound. A variety of suture techniques are used to close a wound, and deciding on a specific technique depends on the location of the wound, thickness of the skin, degree of tensions, and desired cosmetic effect (Perry et al., 2014).

Definition

Suture material is an artificial fiber used to keep wound together until they hold sufficiently well by themselves by natural fiber (collagen) which is synthesized and woven into a stronger scar

- Suture is a Stitch/Series of Stitches made to secure apposition of the edges of a Surgical/Traumatic wound (Wilkins)
- Any Strand of Material utilized to ligate blood vessels or approximate Tissues (Silverstein L.H 1999).

Origin of Material

Suture material is also classified by the origin of material from which it is made

- *Natural* – made from fibers found in nature for example; silk, cotton and catgut
- *Synthetic Material* – is other suture produced with manufactured products for example; nylon, polyglactin 910. Synthetic: Materials are usually chemical polymers and their absorption characteristics are generally more predictable.
- *Metallic Suture* –is limited to surgical stainless steel suture which includes; wire

Purposes of Suture

1. Approximating tissues
2. Ligating blood vessels
3. Transfixing

Selection of Suture Material

A variety of suture materials and suture/needle combinations is available. The choice of suture for a particular procedure is based on the known physical and biologic characteristics of the suture material and the healing properties of the sutured tissues.

Principles of Suture Selection

The selection of suture material by a surgeon must be based on a sound knowledge of

- Healing characteristics of the tissues which are to be approximated,
- The physical and biological properties of the suture materials,
- The condition of the wound to be closed and

The probable post-operative course of the patient

Surgical Sutures

Surgical sutures diagram				
Suture material	Polyglycolic acid	Catgut	Catgut	Polypropylene
Suture technology	Synthetic	Chromic	Plain	Monofilament
Suture color	Violet	Brown or green	Milk-white	Blue
Suture code	PGA	CC	CP	PP

Surgical sutures diagram				
Suture material	Polyester	Silk	Nylon	Stainless steel wire
Suture technology	Braided	Braided	Monofilament	Monofilament
Suture color	White or green	Black or blue	Black or blue	Silvered
Suture code	PB	SK	NL	SW

Suture diameter	USP	11/0	10/0	9/0	8/0	7/0	6/0
	Metric	0.2(0.10)	0.3(0.2)	0.4(0.3)	0.5(0.4)	0.7(0.5)	1(0.7)

Suture diameter	USP	5/0	4/0	3/0	2/0	1/0	1	2	3
	Metric	1.5(1)	2(1.5)	3(2)	3.5(3)	4(3.5)	5(4)	6(5)	7(6)

Thread length (cm)	45, 60, 75, 90, 100, 125, 150

Classification

Sutures are generally classified into four main categories absorbable or non-absorbable, monofilament or multifilament.

A. Natural and synthetic

- *Natural* – silk and catgut
- *Synthetic* – polyglactin 910, polyglycolic acid, polydioxanone, polypropylene, polyester polyamide, linen
- *Absorbable suture* materials provide temporary wound support, while the wound is still healing, and are then absorbed once the wound has sufficient strength to withstand normal stresses.

Advantages – broken down by body and no foreign body left

Disadvantages - time of the wound support catgut polyglactin 91 polyglycolic acid, polydioxanone

- *Non-Absorbable* – generally intended for wound closure, where suture removal is later performed, or when extensive wound support is required.

Advantages – permanent wound support

Disadvantages –foreign body left, suture sinus and sinus extrusion Ex.silk, nylon, polypropylene, polyester, polyamide, linen

- *Monofilament* – Suture materials are a single strand. This structure allows the suture material to pass through the tissues with less resistance and is less resistant to harbouring bacteria.
- *Advantages* – smooth surface, low friction, less drag, less tissue truma, less tissue infection ,no capillarity .

- *Disadvantage* **-** handling and knotting and stretch ability and bending –pliability. Ex.polyglactin 910, catgut, gluconate, polydioxanone, poly-propylene, polyamide.
- *Multifilament* – Suture material is comprised of several filaments, which are twisted or braided together. These materials are less stiff to handle, but have higher coefficient of friction. Multi filament generally has higher tensile strength, flexibility, and more pliable with better handling and knot security. However, multifilament materials have increased capillarity, which results

Absorbable Suture	**Polyglactin 910 (Synthetic)**	**Polyglycolic Acid (Synthetic)**	**Polyglycolic Acid coated with magnisum state (Synthetic)**	**Natural Gut**	**Glyconate (Uncoated)**
Brand Name	Vicryl	Safil @Violet	Safil @ Quick	Catgut (plain and chromic)	Monosym
Structure	Braided and monofilament	Braided	Braided	Monofilament	Monofilament
Color Tensile Strength	Violet or undyed 65% after 14 days 40% at 21 days 10% at 35 days	Violet or undyed 50% after 18 days	Green or undyed 50% after 7 days	Natural brown 50% after 6 days	Violet or undyed 50% after 14 days
Absorption Reeaction	Hydrolysis and low inflammatory tissue response	Hydrolysis and low inflammatory tissue response	Hydrolysis and low inflammatory tissue response	Proteolysis & high inflammatory tissue response	Complete mass Absorption 60 to 90 days
Application	Gastro intestinal O&G, Opthalmic, Orthopedics, urology surgeries, skin closure (intra/subcutaneous)	Gastro intestinal O&G, Opthalmic, Orthopedics, urology surgeries, skin closure (intra/subcutaneous), neurosurgery and ligature	O&G (episiotomy), ophthalmic (Conjunctival suturing), oral mucosa, paediatrics, skin closure (intra/subcutaneous), neurosurgery and ligature	O&G, Opthalmic, Orthopedics,	Gastrointestinal, O&G, urology, plastic and reconstructive surgeries, skin closure (intra/ subcutaneous) and ligature
Non – Absorbable Suture					
Non-Absorbable Suture	**Polypropylent (uncoated) Sysnthetic**	**Polyester (Coated with silicone) Synsthetic**	**Polyamide(uncoated) Synthetic**	**Silk (Natural silk filaments coated with wax and silicne / uncoated) Synthetic**	**Stainless Steel alloy (Uncoated) Synthetic**
Brand Name	Premilene	PremiCron	Dafilon	Silkam(coated) Virgin Silk (Uncoated)	Steelex
Structure	Monofilament	braided	Monofilament	Monofilament	Monofilament
Color	Blur	Green or white	Blue, black or undyed	Silkam- Black Virgin Silk - Blue	Metallic
Tensile Strength	-permanent	permanent	permanent	permanent	permanent
Absorption Reeaction	Non-absobable	Non-absobable	Non-absobable	Non-absobable	Non-absobable
Application	Vascular, Cardiac, Plastic and reconstructive, skin closure, neurosurgery, microsurgery, gastrointestinal surgeries.	Cardiac and orthopaedics	Plastic and reconstructive, skin closure, neurosurgery, microsurgery and ophthalmic surgeries	General skin closure, oral surgeries, neurosurgeries and ligature	Orthopaedic Surgeries

in the suture material absorbing fluid and may result in wicking of bacteria through the tissues.

Advantages–better strength, soft and pliable and good handling

Disadvantages–capillary action, tissue trauma, tissue drag, tissue cutting, and harboring bacteria Ex. polyglactin 910, polyglycolic acid, polyester, silk.

Different Sizes of Suture Materials

Suture Size

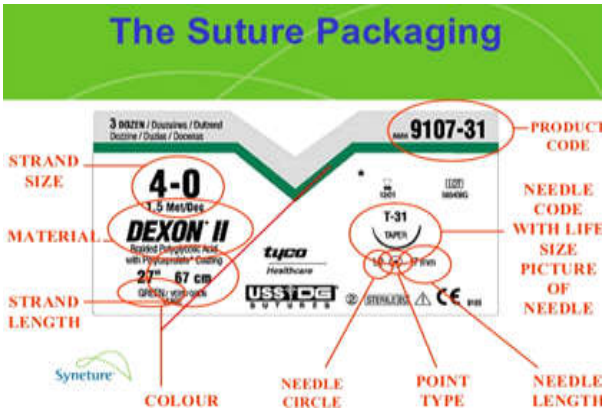
The size of suture material is measured by its width or diameter and is vital to proper wound closure. As a guide the following are specific areas of their usage:

- Size 0:largest suture
- Size 1-0 and 2-0: Used for high stress areas requiring strong retention, i.e. – deep fascia repair
- Size 3-0: Used in areas requiring good retention, i.e. – scalp, torso, and hand chest, abdomen, back
- Size 4-0: Used in areas requiring minimal retention, i.e. – extremities. Is the most common size utilized for superficial wound closure.
- Size 5-0: Used for areas involving the face, nose, ears, eyebrows, and eyelids.
- Size 6-0: Used on areas requiring little or no retention. Primarily used for cosmetic effectnose, lip, face and penis
- Size 7-0:smallest suture, skin eyelid, lipand face .

Suture Removal Timing

1. Scalp-6-8days
2. Face, lip, eyelids, eyebrows, & nose-3-5 days
3. Ear-10-14 days .

Reading the Suture Label



4. Chest and abdomen -8-10 days.
5. Back -12-14 days .
6. Extremites -12-14 days
7. Hand -10-14 days .
8. Foot and sole -12-14 days .
9. Penis -8-10 days .
10. Condition delaying wound healing -14-21 days

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Review Article

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Biostatistics in Dentistry

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Abstract

Statistics can be useful in every stage of practice. It may be with regard to materials being used, patients treated and for research purpose testing the efficacy of a certain treatment method. Statistical tests are not universal. Specific statistical test should be applied for specific purpose. This article discusses about what is statistics and various statistical tests used in dentistry.

Keywords: Biostatistics; P-Value; Tests.

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Introduction

The Merriam-Webster's Collegiate Dictionary definition is: "A branch of mathematics dealing with the collection, analysis, interpretation, and presentation of masses of numerical data." The steps of statistical analysis involve collecting information, evaluating it, and drawing conclusions. Statistics is the science and art of dealing with variation of data in order to obtain reliable results and conclusions „. Biostatistics is the application of statistics to problems in the biological sciences, health, and medicine [1,2].

Biostatistics is used to determine how diseases develop, progress and spread. For example, biostatisticians use statistics to predict the behavior of an illness like the flu. It's used to help predict the mortality rate, the symptoms and even the time of year people might get it [3]. Another well known uses of biostatistics in epidemiology, was in research for the development of the polio vaccine in the 1950s. Readers of the dental literature will often find articles that attempt to show that one particular therapy is more effective than another, but statistics can also demonstrate when there is a relationship between two or more variables [6].

Types of Data [7]

1. Categorical data

   A. Binary data (subset of categorical data)
2. Ordinal data
3. Quantitative data

Uses of Statistics

1. To promote health legislation and in creating administrative standards
2. To determine success or failure of specific oral health care programs or to evaluate the program action
3. To indicate the basic factors underlying the state of oral health by diagnosing the community and solutions
4. To assess the state of oral health in the community and to determine the availability and utilization of dental care facilities

Steps in a Research Project

In practice, every **research project** or study involves the following **steps**.

1. Planning/design of study
2. Data collection
3. Data analysis
4. Presentation
5. Interpretation

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p-Value : The P-value is the probability of obtaining the sample results if the null hypothesis, that there is 'no effect' in the population, is true.

p-Value is the probability of observing the difference or a greater difference when there is in fact no difference. The p-value measures consistency between the results actually obtained in the trial and the "pure chance" explanation for those results. In theory, the P value is a continuous measure of evidence, but in practice it is typically trichotomized approximately into strong evidence, weak evidence,

Table 1: Selecting proper statistical tests

Q1, difference/ correlation	Q2, paired/repeated	Q3 and Q4, type of outcome (normality)	Q5, no. of groups	Valid tests
Difference	Independent (unpaired)	Continuous (normal)	2	Student s t-test
			>2	One-way ANOVA
		Continuous (non-normal)/ordered categorical	2	Mann Whitney U test
			>2	Kruskal Wallis H test
		Nominal	2	Fisher s exact test
			>2	Chi-square test
			2	Log-rank test (Kaplan Meier plot)
	Dependent (paired)	Continuous (normal)	2	Paired t-test
			2	Repeated measured ANOVA Mixed effect regression
		Continuous (non-normal)/ordered categorical	2	Wilcoxon signed-rank test
			>2	Friedman test
		Nominal	2	McNemar s test
Correlation		Continuous (normal)		Pearson s correlation (r)
		Continuous (non-normal)/ordered		Spearman s correlation (rs)
		Nominal (two levels)	2	Spearman/Kappa (agreement)

Table 2: Comparison of Means: look for the difference between the means of variables

Paired T-test	Tests for the difference between two related variables. When the means being compared come from observations that are naturally paired or matched **Ex**. Before vs after studies, also called longitudinal studies produce paired data. Each patient contributes two paired observations: the before value and the after value.
Independent T-test	Tests for the difference between two independent variables. The independent-samples t test evaluates the difference between the means of two independent or unrelated groups. That is, we evaluate whether the means for two independent groups are significantly different from each other.
ANOVA	Tests the difference between group means **after** any other variance in the outcome variable is accounted for. The ANOVA method assesses the relative size of variance among group means (between group variance) compared to the average variance within groups (within group variance).[5]
The Mann-Whitney U test	appropriate test for ordinal data on two independent groups. The non-parametric Mann-Whitney U tests differences in rank order, whereas the t-test examines differences in means. The Mann-Whitney U test was not done as, in general, it is easier to obtain statistical significance with a parametric test, such as a t-test, as compared with a non-parametric test. [10]
Z Test	A Z-test is a type of hypothesis test. Hypothesis testing is just a way for you to figure out if results from a test are valid or repeatable. For example, if someone said they had found a new drug that cures cancer, you would want to be sure it was probably true. A hypothesis test will tell you if it's probably true, or probably not true. A Z test, is used when your data is approximately normally distributed.

and no evidence (these can also be labeled highly significant, marginally significant, and not statistically significant at conventional levels), with cutoffs roughly at P = 0.01 and 0.10 [4]. A relationship exists between P-values, confidence intervals and the null value.[7] The confidence interval is a range of values calculated by statistical methods which includes the desired true parameter (for example, the arithmetic mean, the difference between two means, the odds ratio etc.) with a probability defined in advance (coverage probability, confidence probability, or confidence level). The confidence level of 95% is usually selected [11].

Statistical Significance

An effect is statistically significant if the null hypothesis is rejected, usually if $P < 0.05$. Until relatively recently statistical results in published medical and dental papers tended to report in terms of significance levels (eg $0.01 < P < 0.05$ or $0.001 < P < 0.01$), the modern trend is to quote exact *P*-values (eg $P = 0.03$ or $P = 0.007$) and concentrate on 95% confidence intervals [12].

Paired T-test Tests for the difference between two related variables. When the means being compared come from observations that are naturally paired or matchedEx. "Before vs after" studies, also called "longitudinal" studies produce paired data. Each patient contributes two paired observations: the before value and the after value.

Independent T-test Tests for the difference between two independent variables. The independent-samples t test evaluates the difference between the means of two independent or unrelated groups. That is, we evaluate whether the means for two independent groups are significantly different from each other.

ANOVA Tests the difference between group means after any other variance in the outcome variable is accounted for. The ANOVA method assesses the relative size of variance among group means (between group variance) compared to the average variance within groups (within group variance) [5].

The Mann-Whitney U test appropriate test for ordinal data on two independent groups. The non-parametric Mann-Whitney U tests differences in rank order, whereas the t-test examines differences in means. The Mann-Whitney U test was not done as, in general, it is easier to obtain statistical significance with a parametric test, such as a t-test, as compared with a non-parametric test [10].

Z Test A Z-test is a type of hypothesis test. Hypothesis testing is just a way for you to figure out if results from a test are valid or repeatable. For example, if someone said they had found a new drug that cures cancer, you would want to be sure it was probably true. A hypothesis test will tell you if it's probably true, or probably not true. A Z test, is used when your data is approximately normally distributed.

Conclusion

The understanding of biostatistics is very important to get a validated result of the study. Every step of the research from study design, sample size, p values to application of statistical tests should be done diligently to avoid any bias that might affect the outcome of the research. This article is yet another attempt to guide the research person.

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Ethical Clearance: Not applicable

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