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Introduction

Infectious diseases is one of the leading cause of death worldwide. In 2012, it was responsible for 68% of all deaths globally [1]. All these are due to the emergence of multidrug resistant pathogens which contributes to the high causes of death world-wide [2]. The screening of plant extracts and plant products for antimicrobial activity has shown that plants represent a potential source of new anti-infective agents [3].

Lannea kerstingii has been reported to contain: tannins, flavonoids, alkaloids, steroids and triterpenes [4,5,6]. It is a tree with a height of 12m and 40cm in diameter, with a wide-spreading and relatively dense crown. The bark is smooth to slightly fissured, fissures spiral around the trunk (spiral grain), pale grey with pinkish, white-striped slash [7]. This plant is widely utilized in traditional medicine by various cultures in the world and their applications vary. In Sudan, a decoction of the back is used to treat swellings [8]. The back, leaves and bud are used for flatulence [9], the fruits are used against rickets and scurvy [10], the stem bark is also used in the treatment of malaria [11], hemorrhage, diarrhoea and epilepsy [4]. Also, in some areas in West Africa, it is prescribed against oedema, rickets, wounds, scurvy, scorbut and epilepsy [5].

Materials and method

Plant collection and identification

The plant was collected in May, 2011 at area BZ, Ahmadu Bello University, Zaria, Kaduna State, Nigeria and identified by a botanist Mal. Umar Galla of the Department of
Biological Science, Ahmadu Bello University, Zaria, Nigeria.

A voucher specimen (1832) was deposited in the herbarium for future references. After identification, the stem bark was dried under shad for two weeks, after which the size was reduced using mortar and pestle, filtered for homogeneity and kept away from light until further use.

**Extraction**

The stem bark (580g) was extracted (maceration) with petroleum ether (3x1.5L) at room temperature. The mark was subsequently extracted with ethyl acetate (3 x 1.5L) at room temperature. Both extracts were concentrated under reduced pressure to yield a pale yellow gel petroleum ether extract (4.32g) and a greenish brown solid ethyl acetate extract (10.72g).

**Isolation**

The ethyl acetate extract (5g) was subjected to dry vacuum liquid chromatography on silica gel for TLC (Merck) using chloroform – ethyl acetate; 25:75 (210ml), 50:50, (90ml), 25:75 (4x90ml), 0:100 (6x90ml) successively. This procedure afforded 12 fractions. Fraction 6 (150mg) from CHCl :EtOAc (75:25) contained some precipitate which was separated from the rest of the solvent by decanting and washing with chloroform. The precipitate was further subjected to chromatography on sephadex LH-20 eluting with a mixture of CH3OH and CHCl3 (70:30) to yield 50mg of compound labeled C9. The Thin layer chromatography (TLC) using CHCl3-EtOAc (1:9) showed a spot with Rf value of 0.42. The ‘H and 13C NMR spectrum of C9 was recorded in DMSO-d6 at 400 MHz and 125 MHz, respectively.

TLC chromatograms obtained were sprayed with a saturated solution of cetric sulphate in 65% sulphuric acid; the plates were heated at 120°C for 15 minutes.

**Test organisms**

The bacteria isolates viz: *Staphylococcus aureus; Methicillin Resistant Staphylococcus aureus, Streptococcus pyogenes; Bacillus subtilis; Corynebacterium ulcerans; Escherichia coli; Proteus vulgaris; Proteus mirabilis; Pseudomonas aeruginosa; Salmonella typhi; Shigella dysenteriae; Klebsiella pneumonia* and the fungi *Candida albicans, Candida krusei and Candida tropicalis* were gotten from Ahmadu Bello University Teaching Hospital, Zaria, Kaduna state, Nigeria. All the micro-organisms were checked for purity and maintained in slants of agar.

**Assay for antibacterial activity**

The test organisms were first inoculated into tubes of nutrient broth separately and incubated at 37°C for 18 h. Each of the cultures was then adjusted to 0.5 McFarland turbidity standard and (0.2 ml) inoculated onto Mueller Hinton agar (MHA, Oxoid) in petri plates (diameter: 15 cm). A sterile cork borer was then used to make wells (6 mm diameter) for the compound on each of the plates containing cultures of the different test organisms. The compound (C9) was re-dissolved in DMSO to obtain concentrations of 200ug/ml. 0.1 ml of the C9 was then introduced into the wells using sterile Pasteur pipettes. 0.1 ml of DMSO only was introduced in another well to serve as negative control. Wells containing the standard antimicrobials ciprofloxacin and fluconazole (5ug/ml) were included as positive control. The culture plates were allowed to stand on the working bench for 30 min for pre diffusion and were then incubated at 37°C for 24 h. After 24 h, antibacterial activity was determined by measurement of diameter zones of inhibition (mm) (against the test organisms) around each of the extracts and the antibiotics/antifungal.

**Minimum Inhibitory Concentration (MIC)**

The MIC of the extracts were determined for each of the test organisms at varying concentrations of 200, 100, 50, 25, 12.5, and 6.25 mg/ml. To obtain these concentrations, varying concentrations (1 ml) of the extracts containing double strength of the concentrations (200, 100, 50, 25, 12.5, and 6.25 mg/ml) in a test tube, 1 ml of nutrient broth was added and then a loop full of the test organism previously diluted to 0.5 McFarland turbidity standard was introduced to the tubes. The procedure was repeated on the test organisms using the standard antibacterial ciprofloxacin and fluconazole. A tube containing nutrient broth only was seeded with the test organism to serve as
negative control. All the tubes were then incubated at 37°C for 24 h (bacteria) and 27°C for 48 hrs (fungi) and after, examined for growth by observing for turbidity \[14\].

**Minimum Bactericidal Concentration (MBC)/ Minimum Fungicidal Concentration (MFC)**

1 ml bacterial/fungi culture was pipetted from the mixture obtained in the determination of MIC tubes which did not show any growth and subcultured on to MHA and incubated at 37°C for 24 hrs (bacteria) and 27°C for 2-7 days (fungi) respectively. After incubation the concentration at which there was no single colony growth of bacteria/fungi was taken as MBC/MFC \[15\].

**Results**

The ¹H-NMR of compound C9 revealed a series of peaks (singlets) between dH 0.65 to dH 0.99. It also showed a prominent peak at dH 3.37, peaks between dH 2.8 to 3.8 indicates the presence of a glucoside. Some other prominent peaks include dH 5.35 (t) indicating an olefinic proton, dH 4.21(d) indicating an anomic proton.

The ¹³C-NMR showed the presence of 35 carbon atoms with some prominent peaks like dc 140.9, dc 121.8, dc 101.4, dc 77.42 which indicates the presence of olefins, and carbons linked to oxygen. Some other prominent peaks include dc 74.09, dc 70.54, dc 61.55 which also indicates carbons linked to oxygen.

The HSQC was used to connect the protons with their various carbon atoms as summarized in Table 4.3. The HMBC showed correlations between the protons signal at dH 4.2 (H1') and carbon signal dc 77.42 (C3, J3).

**Compound C9**: β-sitosterol-3-O-β-D-glucoside (1)

\[\text{\textit{1H NMR (400 MHz, DMSO-d6,):}}\]

\[\text{0.65 (3H, s, Me-18) 0.80 (3H, m, Me-26), 0.79 (3H, m, Me-27) 0.85 (3H, m, Me-29)}\]

\[0.96 (3H, s, Me-19) 0.90 (3H, d, J = 7.2 Hz, Me-21) 3.37 (IH, m, H-3), 4.24 (IH, H-1'), 5.35 (IH, m, H-6); \text{\textit{13C NMR (125 MHz, DMSO-d6): ppm 12.16 (C-18) 12.28 (C-29), 20.20 (C-26), 19.10 (C-19) 19.58 (C-27), 21.06 (C-11) 23.05 (C-28), 24.33 (C-15), 25.86 (C-23), 28.27 (C-16) 31.84 (C-25), 29.15 (C-2), 31.80 (C-8), 31.84 (C-7), 33.76 (C-22), 36.68 (C-20), 37.29 (C-10), 38.75 (C-1), 39.55 (C-4), 39.34 (C-12), 42.32 (C-13), 45.59 (C-24), 50.01 (C-9), 56.69 (C-17), 55.92 (C-14), 61.55 (C-6'), 70.54 (C-4'), 74.09 (C-2'), 77.42 (C-5'), 77.42 (C-3'), 77.42 (C-3), 101.41 (C-1'), 121.83 (C-6), 140.90 (C-5).}\]

\[\text{\textit{\beta-Sitosteml-3-O-glucoside (1)}}\]

**Discussion**

The TLC plate containing C9 showed a red-brown colour when sprayed with a solution of ceric sulphate in 65% sulphuric acid and plate heated at 120°C for 15 minutes \[13\]. This suggested the presence of a steroidal skeleton. The protonic spectrum showed six methylic signals, two singlets (Me-18 and Me-19), three doublets (Me-21, Me-26 and Me-27), and one triplet (Me-29), whose chemical shifts obtained by a HETCOR experiment were in accordance with a \(^\text{1}^\text{3}\) sterol. The up field chemical shift at d 38.75, 29.15, 77.42, 39.55, 121.83, 31.84, 21.06, 39.34, 24.33 and 28.27
Table 1: Zone of inhibition of C9 on some disease causing organisms

<table>
<thead>
<tr>
<th>Organisms</th>
<th>Zone of inhibition (mm)</th>
<th>C9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Ciprofloxacin (5µg/ml)</td>
</tr>
<tr>
<td>S. aureus</td>
<td></td>
<td>27</td>
</tr>
<tr>
<td>MRSA</td>
<td></td>
<td>24</td>
</tr>
<tr>
<td>S. pyogenes</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>B. subtilis</td>
<td></td>
<td>34</td>
</tr>
<tr>
<td>C. ulcerans</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>E. coli</td>
<td></td>
<td>27</td>
</tr>
<tr>
<td>P. vulgaris</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>P. mirabilis</td>
<td></td>
<td>24</td>
</tr>
<tr>
<td>P. aeruginosa</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>S. typhi</td>
<td></td>
<td>24</td>
</tr>
<tr>
<td>S. dysenteriae</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>K. pneumonia</td>
<td></td>
<td>31</td>
</tr>
<tr>
<td>C. albicans</td>
<td></td>
<td>23</td>
</tr>
<tr>
<td>C. krusei</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>C. tropicalis</td>
<td></td>
<td>22</td>
</tr>
</tbody>
</table>

The very low MIC and MBC of C9 on both gram positive and gram negative bacteria (Table 2) indicates the broad spectrum activity of β-sitosterol-3-O-glucoside its potential use as antimicrobial agent. Studies established β-sitosterol as potent antimicrobial agent at lower concentration against a wide range of bacteria including E. coli, Staphylococcus aureus, Klebsiella pneumonia and Pseudomonas aeruginosa [20] which is in line with the current studies though compound C9 (β-sitosterol-3-O-β-D-glucoside) was inactive against P. aeruginosa.

The low MIC of β-sitosterol-3-O-glucoside (Table 2) showed compound’s activity against both Gram positive and Gram negative bacteria which are associated with different type of infections including urinary tract infections and typhoid fever (S. typhi). S. aureus which is also responsible for a wide variety of diseases including skin and soft tissue infections, pneumonia, and diabetic foot infections [21] can be managed using this compound. Similarly, P. aeruginosa is a common pathogen associated with burn wound infections, keratitis, and respiratory tract infections [22]. The compound also showed activity against E. coli which is the commonest cause of urinary tract infection and accounts for approximately 90% of first urinary tract infection in young women [23]. Thus this indicates the usefulness of this plant in the treatment of urinary tract infection, respiratory tract infections, diabetic foot infections due to its activity against the organisms causing these infections.

In view of the fact that S. aureus is a pyogenic bacterium known to play significant role in invasive skin diseases including superficial and deep follicular lesion [24] and that prevalence of S. aureus resistant strains to conventional antibiotics has increased to high levels in some hospitals [22], β-sitosterol-3-O-β-D-glucoside could serve as a remedy to such resistance since it is active against MRSA. The compound has also showed the same high level of activity against E. coli which is the commonest cause of urinary tract infection and accounts for approximately 90% of first urinary tract infection in young women [23,25]. Thus this result gives scientific base and credence for the claims of the therapeutic capabilities and folkloric usage of the various...
parts of *Lannea kerstingii* for the treatment of various ailments.

**Conclusion**

The compound β-sitosterol-3-O-glucoside isolated from *Lannea kerstingii* showed a wide spectrum antibacterial and antifungal activity at concentration of 200µg/ml against *S. aureus*, MRSA, *P. mirabilis*, *S. typhi*, *K. pneumoniae*, *E. coli*, *B. subtilis* and also active against the fungi *C. albicans* and *C. tropicalis*. This shows that the compound’s ability to treat a wide range of infectious diseases.

**References**

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**Authors:**

Reddy P, Chadaga S, Noskin GA.
Effectiveness Magnesium Sulphate Crystal Fomentation Vs Paste Application for Phlebitis among Children Receiving Peripheral Infusion who are Admitted at Selected Hospital at Mangalore

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Abstract
Background: Peripheral cannulation is one of the commonly used procedures in children, as they have to undergo many infusions for the administration of medications. The nurse is responsible for maintaining and monitoring IV infusion site and promptly detecting any complication like phlebitis, infiltration, air embolism, infection and fluid overload. In children phlebitis is the most commonly seen due to their fragile veins and therefore special attention should be given to minimize the occurrence of phlebitis and also to treat it effectively.

Objective: to determine the effectiveness magnesium sulphate crystal fomentation vs glycerin magnesium sulphate paste application for phlebitis among children receiving peripheral infusion.

Setting & Design: Regional Advance Pediatric Care Center (RAPCC), Mangalore.

Material and Methods: Quasi experimental design phlebitis measurement chart and observation checklist for erythema.

Result and Conclusion: the mean pre-treatment scores of phlebitis were significantly reduced after the treatment with magnesium sulphate fomentation and with glycerin magnesium sulphate paste application. The mean post treatment score of phlebitis at p<0.05. Glycerin magnesium sulphate paste was effective in reducing swelling and induration when compared to magnesium sulphate crystal fomentation.

Keywords: Phlebitis; peripheral infusion; glycerin magnesium sulphate paste; magnesium sulphate crystals.

Introduction
Intravenous therapy is increasing especially in children and it has also manifested some minor side effects like pain, trauma, swelling, temporary joint immobility. The study estimated that over 80% of all children hospitalised receive IV therapy¹. These can lead to life threatening conditions like thrombosis, embolism, and variety of infections and so on if proper care is not considered promptly. Phlebitis is one of the common side effect seen after IV therapy. It is defined as the inflammation of the vein and is considered as an adverse patient outcome². Phlebitis or infiltration is the escape of fluid into the subcutaneous tissues due to the dislodgement or malfunctioning of the cannula. Magnesium sulphate can be very useful in preventing and treating phlebitis³. Thus the researcher would want to find out the better and cost effective method of reducing phlebitis using the Magnesium preparation, when compared with the traditionally used magnesium Paste.

Objectives of the studywere to:
• Determine the effectiveness of magnesium sulphate crystal fomentation on phlebitis.
• Determine the effectiveness of glycerin magnesium sulphate paste application on phlebitis.
• compare the effectiveness of both intervention on phlebitis.

Purpose of the study was to find the effect of magnesium product in reducing phlebitis.
Materials and methods
A quasi-experimental approach with pre-test post-test design was used for the study. The study sample consisted of 60 children with phlebitis, where 30 children were placed in group I, treated with magnesium sulphate crystal fomentation and 30 children were placed in group II, treated with glycerin magnesium sulphate paste application. Purposive sampling technique was used to select the children. The study was conducted at Regional Advance Pediatric Care Centre (RAPCC), Mangalore. The tool was developed after intensive review of literature, consultation and discussion with experts and also with the personal experience of the researcher. Tool was validated by 13 experts in the field of Pediatrics and Pediatric nursing. The final tool consisted of three parts: Part 1: Demographic Proforma Part 2: Phlebitis Measurement Chart Part 3: Observation Checklist for Erythema. The assessment of phlebitis was done prior to the application of magnesium sulphate crystal fomentation and glycerin sulphate paste application by using phlebitis measurement chart and observation checklist for erythema. Post treatment assessment was conducted on the 3rd day using the same tool. Ethical clearance was obtained from concerned institution. The investigator conducted the pilot study on 10 children, five in treatment I and five in treatment II who satisfied the inclusion and exclusion criteria. The main study was done on 60 children 30 in treatment I and 30 in treatment II. Informed consent was taken from subjects and confidentiality was assured. The Inclusion criteria was: Children between the age group of 1-12 years receiving peripheral infusion including chemotherapeutic infusions.

Statistical Methods
The results were analysed using descriptive statistics like mean, standard deviation and inferential statistics like ‘t’ test. Pre-treatment and post treatment of both the treatment groups were record and compiled for analysis.

Results

<table>
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<th>Demographic data</th>
<th>Items</th>
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<td>Age in years</td>
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<td>12</td>
<td>20</td>
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<tr>
<td></td>
<td>5-8</td>
<td>21</td>
<td>35</td>
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<td></td>
<td>9-12</td>
<td>27</td>
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<tr>
<td>Gender</td>
<td>Male</td>
<td>32</td>
<td>53.3</td>
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<tr>
<td></td>
<td>Female</td>
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<td>46.7</td>
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<tr>
<td>Site of intravenous insertion</td>
<td>Doral palm</td>
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<td>Ventral aspect of forearm</td>
<td>13</td>
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<td>Wrist and antecubital fossa</td>
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<td>Types of fluids</td>
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Table 1: Demographic Data (N=60)
Table 2: Effectiveness of magnesium sulphate crystal fomentation (N=30)

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<tr>
<th>Parameters</th>
<th>Pre-treatment</th>
<th>Post-Treatment</th>
<th>Paired differences</th>
<th>'t' value</th>
<th>p &lt;0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Swelling</td>
<td>33.05</td>
<td>22.02</td>
<td>5.13</td>
<td>4.31</td>
<td>27.92</td>
</tr>
<tr>
<td>Induration</td>
<td>17.26</td>
<td>10.70</td>
<td>3.03</td>
<td>2.76</td>
<td>14.24</td>
</tr>
<tr>
<td>Erythema</td>
<td>2.07</td>
<td>0.64</td>
<td>0.73</td>
<td>0.63</td>
<td>1.33</td>
</tr>
</tbody>
</table>

*t=2.045 at p<0.05  *significant

Table 3: Effectiveness of application of glycerin magnesium sulphate paste (N=30)

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Pre-treatment</th>
<th>Post-Treatment</th>
<th>Paired differences</th>
<th>'t' value</th>
<th>p &lt;0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Swelling</td>
<td>29.09</td>
<td>22.37</td>
<td>2.47</td>
<td>1.99</td>
<td>26.62</td>
</tr>
<tr>
<td>Induration</td>
<td>11.36</td>
<td>9.11</td>
<td>1.36</td>
<td>1.34</td>
<td>10.01</td>
</tr>
<tr>
<td>Erythema</td>
<td>2.0</td>
<td>.69</td>
<td>0.43</td>
<td>0.56</td>
<td>1.57</td>
</tr>
</tbody>
</table>

*significant

Table 4: Comparison of the effectiveness of the two modalities of treatment in the reduction of phlebitis after the application of interventions (N=30+30=60)

<table>
<thead>
<tr>
<th>Treatment groups</th>
<th>magnesium sulphate crystal fomentation</th>
<th>glycerin magnesium sulphate paste application</th>
<th>Paired differences</th>
<th>'t' value</th>
<th>p &lt;0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Swelling</td>
<td>33.05</td>
<td>22.02</td>
<td>29.09</td>
<td>22.37</td>
<td>3.96</td>
</tr>
<tr>
<td>Induration</td>
<td>17.27</td>
<td>10.70</td>
<td>11.37</td>
<td>9.11</td>
<td>5.90</td>
</tr>
<tr>
<td>Erythema</td>
<td>2.07</td>
<td>0.64</td>
<td>2.0</td>
<td>0.69</td>
<td>0.067</td>
</tr>
</tbody>
</table>

|                  | Mean         | SD             | Mean              | SD        | Mean    | SD       |         |
| Swelling         | 5.1283       | 4.32           | 2.47              | 1.99      | 2.66    | 2.33     | 3.061*   | 0.003    |
| Induration       | 3.029        | 2.76           | 1.36              | 1.35      | 1.67    | 1.413    | 2.974*   | 0.004    |
| Erythema         | 0.73         | 0.64           | 0.43              | 0.57      | 0.3     | 0.071    | 1.920    | 0.060    |

*significant

Discussion

Effectiveness of magnesium sulphate crystal fomentation

These findings were supported by a study done for managing local tissue damage caused by extravasation of pharmorubicin with hydropathic compress by Xueming J, Yun L in China in 2005. 50% magnesium sulphate solution and 2% lidocaine and hexadecadrol therapy were used. Here 50% magnesium sulphate solution was found to be effective in reducing phlebitis.

Effectiveness of Glycerin Magnesium Sulphate Paste Application

A study was done by Biswas D in her dissertation to compare the effect of four selected nursing interventions on patients with phlebitis related to peripheral intravenous infusion in Kolkata, West Bengal in 2005 like ichthammol belladonna dressing (treatment I), glycerin magnesium sulphate dressing (treatment II), ichthammol belladonna dressing along with hot fomentation (treatment III) and glycerin magnesium sulphate dressing (IV). It was found that ichthammol belladonna dressing along with hot fomentation was more effective among the four modalities, but it also said that glycerin magnesium sulphate was being used effectively in the treatment of phlebitis.

Comparision of Two Modalities of Treatment in the Reduction of Phlebitis in Children.

These findings are supported by the study done by Huo G, Ying-Jia L, Hui-Juan M on the efficacy of glycerin magnesium sulfate emulsion on the treatment of peripheral phlebitis in 2006. The treatment with glycerin magnesium sulfate emulsion was found to take less time 2.16 & 0.39 days compared to control group (treated with
50% magnesium sulphate solution) which took 5.17 & 1.15 days. The results of another study done by Lakhani AK, Merchant RJ, Khowaja K in 2006 using glycerin magnesium sulphate paste (treatment I) and magnesium sulphate salt solution (treatment II) also support the present study. It was found that third day post application score of treatment I were 0.7071 and that of treatment II was 1.7571. This clearly indicates that glycerin magnesium sulphate paste was effective in reducing phlebitis.

Recommendations

More studies could be conducted on the large sample and using other form of magnesium products. A study could be conducted to determine the effectiveness of either of the treatments in reducing pain or palpable cord lengths. A study could be conducted to determine the effectiveness of other cost effective modalities like ice application in treatment of phlebitis.

Conclusions

Thus glycerin magnesium sulphate paste application was found to be very effective when compared with magnesium sulphate fomentation in reducing swelling and in duration. This study concludes that the magnesium products are very effective in reducing phlebitis and other infusion related complication. It is a very cost effective method with minimal resources, requires minimal training too, and very easy to use with little or no complications. The study was conducted only on a small sample and limited participants for a very short period thus generalisation is not possible.

Acknowledgement

- Regional Advanced Paediatric Care Center (RAPCC) for permitting to conduct the study
- Principal & teaching faculty of Sahyadri College of Nursing, especially Department of Child Health Nursing - for material help, general support.
- Participants of the study for their whole hearted participation

References

2. Lakhani AK, Merchant RJ, Khowaja K. Translating research into practice. Intravenous (I/V) related phlebitis 2006; 7(22).
3. At glance IV tips. Phlebitis - the sequel infusion nurse. April; 2010.
4. Biswas D. Dissertation to compare the effect of four selected nursing interventions on patients with phlebitis related to peripheral intravenous infusion in selected hospital of Kolkata. West Bengal; 2005.
Effectiveness of Exercises on Low Back Pain among Middle Aged Women at Puducherry

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Abstract

Background: Women in their 30’s, 40’s and 50’s have a higher incidence of low back pain due to a combination of risk factors that typically appears in the middle age. Addressing these underlying causes can significantly reduce the incidence of back pain. The objectives of the study were to assess the level of low back pain among middle aged women and to determine the effectiveness of selected exercises on low back pain among middle aged women.

Materials and Methods: A quasi experimental research design was adopted. The data were collected using Demographic proforma and McCaffery pain scale. 40 subjects with low back pain were identified and exercises that consisted of abdominal strengthening, back strengthening and hip stretching exercises were taught and practiced by them daily for half an hour for a period of one month. Frequency, Percentage 't' tests & chi-square were used for analysis.

Results: The results showed a significant difference in pretest and post test pain levels at p<0.001 level.

Conclusion: The findings of the study implied that LBP is a common problem among middle aged women and doing exercises regularly would help to alleviate the pain.

Keywords: Low back pain, exercises, middle aged women
effectiveness of selected exercises on low back pain among middle aged women and to find out the association between the level of low back pain with selected demographic variables.

**Materials and Methods**

Quasi experimental study design was adopted where there was an Experimental and control group, but no randomization.

<table>
<thead>
<tr>
<th>Group</th>
<th>Pretest</th>
<th>Intervention</th>
<th>Post test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>O1</td>
<td>X</td>
<td>O2</td>
</tr>
<tr>
<td>Control</td>
<td>O1</td>
<td></td>
<td>O2</td>
</tr>
</tbody>
</table>

The study was conducted in Pillaiyarkuppam village of Puducherry. The population of the study included middle aged women between 35-58 years. A total of 40 samples were selected, where the first 20 identified with low back pain were assigned to experimental group and the remaining 20 to control group. Non probability purposive sampling technique was used to select the samples.

The instrument used to collect the data consisted of 2 parts.

Part I – consisted of the demographic data of women which included age, type of family, occupational status, educational status, number of siblings, duration of pain, BMI etc.,

Part II – Mc Caffery pain scale to assess the level of pain. It is a numerical scale where the user has the option to verbally rate the scale from 0-10 or to place a mark on a line indicating their level of pain.

0 No Pain
0-3 Mild Pain
4-6 Moderate Pain
7-10 Severe Pain

After obtaining content validity from the experts the tool was used to collect data. The middle aged women who fulfilled the inclusion criteria were selected and consent was obtained from each participant. The level of low back pain was assessed for both experimental and control group. For subjects in the experimental group, exercises that consisted of abdominal muscle strengthening, back strengthening and hip stretching exercises were taught on the first day. The subjects continued to do the exercises for half an hour daily for 30 days under the supervision of the investigator. The post test was carried out on the 31st day to assess the level of low back pain in both the experimental and control group.

**Statistical Methods**

Descriptive (frequency and percentage), and inferential statistics (paired t test, independent t test and chi square) were used for analysis of the study.

**Results**

1. **Demographic socio-economic characteristics:** Out of 40 samples majority of the women 19(47.5%) belonged to the age group of 40 - 45 years, 29(72.5%) were homemakers, 16(40%) had a complaint of low back pain for 6months-1year and 21(52.5%) were of normal weight and 12(30%) were overweight.

2. **Assessment of low back pain in the experimental and control group during pre test and post test.**

The mean pre test score was 5.75 and mean post test score was 3.80 with a SD of 1.12 and 0.95 respectively. The computed ‘t’ value was 5.9379 which was significant at p<0.001 level.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Test</th>
<th>Mean</th>
<th>SD</th>
<th>t Value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low back pain</td>
<td>Pre test</td>
<td>5.75</td>
<td>1.12</td>
<td>5.9379</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Post test</td>
<td>3.80</td>
<td>0.95</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The mean pre test score was 5.75 and mean post test score was 3.80 with a SD of 1.12 and 0.95 respectively. The computed ‘t’ value was 5.9379 which was significant at p<0.001 level.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Mean</th>
<th>SD</th>
<th>t Value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low back pain</td>
<td>Experimental</td>
<td>3.80</td>
<td>0.95</td>
<td>4.3397</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>5.30</td>
<td>1.22</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The mean value was 3.80 with a SD of 0.95 in the experimental group whereas the mean was found to be 5.30 with a SD of 1.22 in the control group. The computed t value was 4.3397 which was significant at P<0.001 level.

1. There was no significant association between the level of low back pain with selected demographic variables.

Discussion
The prevalence of low back pain is a common problem among middle aged women. Out of 40 samples 29(72.5%) experienced moderate level of low back pain, and among that 19(47.5%) belonged to the age group of 40-45 years, 29(72.5%) were housewives and 17(42.5%) experienced pain more often.

A study done at Rural Bangladesh revealed that the mean age of occurrence of low back pain was 45 years and 70% were housewives. Female vulnerability is due to their occupation (housewife) which involved bending and twisting movements of the spine.

In the present study majority of the women 12(60%) had moderate level of pain, 8(40%) had severe pain and none experienced mild pain. But after the exercises, nobody experienced severe pain, 7 (35%) had mild pain and 13 (65%), experienced moderate level of pain.

Moreover the effectiveness of exercises within the experimental and between the control group was found to be highly significant at P<0.001 level.

The findings were supported by a study conducted in 2014 on the efficacy of muscle strengthening exercises among patients with chronic low back pain. The results revealed that after the muscle strengthening exercises the level of pain as measured by the numeric rating scale was reduced after the intervention, and there was no significant improvement in the level of pain in the control group.

Conclusion
Most of the women experience low back pain in their daily lives. Lack of exercises can aggravate this condition. Exercises offer a real potential for improving the health status and quality of life. Hence every woman should spare time to do exercises on a regular basis which goes a long way in their lives that is cost effective and prevents complications.

References
3. www.backpain.expert.co.uk.
Introduction

Cervical cancer is one of the leading cancers among women, which affects approximately 4,90,000 women each year, resulting in approximately 2,70,000 deaths worldwide. Epidemiological studies have shown that 70-90% of all cancers are environmental. Lifestyle related factors are the most important and preventable among the environmental exposures. Dietary practices, reproductive and sexual practices will account for 20-30% of cancers. Dietary intervention by millet based antioxidants has been shown to dramatically reduce the incidence of PCCL.

Aim: The aim of the study was to evaluate the effectiveness of dietary intervention on precancerous cervical lesion among women.

Methodology: A Quasi experimental research design, convenient sampling technique was used to collect data from 100 women in Bangalore rural. Data was collected by using structured interview schedule and VIA observation rating scale followed by dietary intervention through administration of millet based antioxidants for 90 days to women in experimental group.

Statistical Analysis: The data was collected and analyzed using software statistical package for social sciences (SPSS) version 12.0.

Results: The mean PCCL after dietary intervention was 3.0 (SD = 2.5) significantly less than the pretest 7.04 (SD = 1.4), t = 20.3 (p < 0.05).

Conclusion: It was found that dietary intervention was significantly effective in reducing PCCL among women.

Keywords: Effectiveness, Dietary intervention, PCCL, Women

Introduction

The health of women represents the health status of any country. Women form a vulnerable or special risk group. A women’s health is her total well-being, not determined solely by biological factors and reproduction, but also by effects of work load, nutrition, stress, war and migration, among others. Blame it on changing lifestyle or lesser body resistance; women’s growing health issues are catching everyone’s eyes. Five most common health problems among women today are Breast cancer, Stroke, Polycystic ovarian disease, Female sexual arousal disorder and Obesity. Cancer a dreadful disease is an unusual or abnormal uncoordinated growth of tissue beyond the normal tissue in any particular area of the body. According to the National Cancer Registry Programme of India, cancers of the uterine cervix and breast are the leading malignancies noted in Indian women. Cervical cancer represents the second most common cancer in women world wide. The incidence varies geographically with rates in industrialized nations of 10 per 1,00,000 & in developing countries of 40 per 1,00,000. Approximately 80% of all new cases are diagnosed in developing nations of the world.

Cervical cancer is one of the leading cancers among women, which affects approximately 4,90,000 women each year, resulting in approximately 2,70,000 deaths worldwide. It has been estimated that in India, 1,00,000 new cases of cervical cancer occur annually, and 70% or more of these cancers are stage III or higher at the time of diagnosis. There has been a regular campaign against cervical cancer for 30 years in India, but this has had little
impact on the morbidity and mortality from the disease, with India ranking fourth worldwide. The cancer mostly affects middle-aged women (between 40 and 55 years), especially those from the lower economic status who fail to carry out regular health check-ups due to financial inadequacy. In urban areas, cancer of the cervix account for over 40% of cancers while in rural areas it accounts for 65% of cancers as per the information from the cancer registry in Barshi.

Carcinoma of cervix is one of the most common forms of cancers in women and is the second biggest cancer mortality worldwide. The world wide incidence is found to be 500000 per year, about half of which results in death. Over 80 percentage of incidence occurs in developing countries with 25 percentage is estimated to occur in India. A very high risk of cervical cancer is observed in India. India accounts for a quarter (1,26,000 new cases, 71,000 deaths around the year 2000) of the world burden of cervical cancer (4,71,000 new cases and 2,33,000 deaths). Control of cervical cancer by early detection and treatment is one of the priorities of the National cancer control programme of India. In Bangalore, it is 26.4 per 1,00,000 women.

Though a slow and steady decline in cervical cancer incidence rates is observed in some urban populations, the rates are still high, particularly in rural areas, and the absolute number of cases is on the increase due to population growth (NCCP).

Vinegar has proved to be useful as a cheap and effective screening test for cervical cancer. The researcher who established its potential say it could improve the chances of preventing cancer in developing world. At the moment, 5% of women in the developing world are screened for cervical cancer. In industrialized nations the figure is 70%. Vinegar acetic acid could be used where the standard PAP smear is unavailable or too expensive. In the UK, the NHS cervical screening programme estimates that testing for early signs prevents up to 3,900 cancers each year. According to WHO about 2,88,000 women a year die from cervical cancer. Most live in the developing world. With cervical cancer, early screening is the ounce of prevention that can cure. No woman should be denied that opportunity.

What you eat can hurt you, but it can also help you. One of the easiest and most effective ways to promote good health and to help protect against cancer is with our diet. The national cancer institute and The American cancer society estimates that roughly one third of all cancer deaths may be diet related. Food rich in anti-oxidants could play a preventive role.

Objective
1. To evaluate the effectiveness of dietary intervention on Pre cancerous cervical lesion (PCCL) among women in selected rural area, Bangalore.

Hypothesis
H₁: There will be significant difference between the Pre cancerous cervical lesion (PCCL) before and after dietary intervention among women in experimental group.

H₂: There will be a significant difference in the mean difference of Pre cancerous cervical lesion (PCCL) between women in experimental and control group.

Materials and Methods
A Quasi experimental research design, convenient sampling technique was used to collect data from 100 women who are residing in villages coming under Anugondanahalli P.H.C. Hoskete taluk, Bangalore rural. The study was explained and informed consent was taken. Data was collected by using structured interview schedule and VIA (Visual inspection of acetic acid test) observation rating scale followed by dietary intervention through administration of millet based antioxidants to women in experimental group. Post test was conducted after 90 days to find out the effectiveness.

After obtaining ethical clearance and formal permission from higher authorities, data was collected from those who were willing to participate and included for the study. Confidentiality was assured to the entire subjects to get their co-operation. An informed consent was taken from all the subjects individually after explaining the objectives and purpose of the study.
Inclusion Criteria
- Married women
- Women aged between 20-50 yrs
- Sexually active
- Non pregnant women
- Women with Grade I & Grade II PCCL

Exclusion Criteria
- Women with Post-total hysterectomy status.
- Women who are already diagnosed Cervical cancer and under treatment.
- Women with frank visible ulcerative or Proliferative growth over the cervix.
- Menopause women
- Women with HPV Vaccination
- Women with dense aceto white area present for more than 3 minutes or grade III PCCL.

Tool 1: Sample characteristics.
Tool 2: Observational rating scale on VIA (Visual inspection of acetic acid test)

Results
The study results revealed that, majority of women in experimental group 24(48%) were in the age group of 20-30yrs, 23(46%) had no formal education, 36(72%) were housewives, 50(100%) were Hindus, 22(44%) were in the income range of Rs $\leq$ 1000, 30(60%) were belonging to Joint family, 45(90%) were non vegetarians, 15(30%) had habit of tobacco chewing, 20(40%) were married at the age of 14-16yrs, 49(98%) had no family history of genital malignancies, 50(100%) did not have post coital bleeding and 32(64%) did not have history of white discharge. In menstrual variables 49(98%) had regular menstrual cycle, 25(50%) had attained menarche at the age of 13yrs, 47(94%) had normal menstrual flow, 39(78%) were using cotton cloths during menstruation, 40(80%) were reusing cloths used during periods, 40(80%) were washing cloth with cold water and drying in sunlight, 40(80%) were changing cloths twice daily and 50(100%) were taking bath daily once. In sexual practice variables majority 20(40%) were exposed to sex at the age of 15-16yrs, 23(46%) were having sex once a week, 28(56%) were washing perineal area after the sex, nobody had history of multiple sexual partner, nobody used condom during sex and nobody practiced sex during menstrual periods.

### TABLE 1: Classification of Respondents by Demographic variables

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Category</th>
<th>Control (n=50)</th>
<th>Experimental (n=50)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-30 years</td>
<td>26</td>
<td>52.0</td>
<td>24</td>
</tr>
<tr>
<td><strong>Education status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No formal education</td>
<td>16</td>
<td>32.0</td>
<td>23</td>
</tr>
<tr>
<td>Higher secondary</td>
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<td>42.0</td>
<td>19</td>
</tr>
<tr>
<td><strong>Occupational status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>25</td>
<td>50.0</td>
<td>0</td>
</tr>
<tr>
<td>House wife</td>
<td>22</td>
<td>44.0</td>
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</tr>
<tr>
<td><strong>Religion</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hindus</td>
<td>50</td>
<td>100.0</td>
<td>50</td>
</tr>
<tr>
<td><strong>Family income/month</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>$\leq$ Rs 1000</td>
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<td>22.0</td>
<td>22</td>
</tr>
<tr>
<td>Rs 1001 - 2000</td>
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<td>66.0</td>
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</tr>
<tr>
<td><strong>Type of family</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Joint family</td>
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<td>54.0</td>
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<tr>
<td><strong>Type of Diet</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non vegetarians</td>
<td>48</td>
<td>96.0</td>
<td>45</td>
</tr>
<tr>
<td><strong>Habit</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tobacco chewing</td>
<td>21</td>
<td>42.0</td>
<td>15</td>
</tr>
<tr>
<td><strong>Age at marriage</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 - 16yrs</td>
<td>38</td>
<td>76.0</td>
<td>20</td>
</tr>
<tr>
<td><strong>Age at menarche</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13yrs</td>
<td>29</td>
<td>58.0</td>
<td>25</td>
</tr>
<tr>
<td><strong>Family history of genital malignancies</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>01</td>
<td>0.2</td>
<td>01</td>
</tr>
<tr>
<td>No</td>
<td>49</td>
<td>98.0</td>
<td>49</td>
</tr>
<tr>
<td><strong>Post coital bleeding</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>50</td>
<td>100.0</td>
<td>50</td>
</tr>
<tr>
<td><strong>Type of material used during menstruation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sanitary napkin</td>
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<td>32.0</td>
<td>11</td>
</tr>
<tr>
<td>Cotton cloth</td>
<td>34</td>
<td>68.0</td>
<td>39</td>
</tr>
<tr>
<td><strong>Reuse of cloth pad</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>34</td>
<td>68.0</td>
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</tr>
<tr>
<td>No</td>
<td>16</td>
<td>32.0</td>
<td>10</td>
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</tbody>
</table>
Whereas in control group majority of women 26(52%) were in the age group of 20-30yrs, 21(42%) had higher secondary education, 25(50%) were private employees, 50(100%) were Hindus, 33(66%) were in the income range of Rs1001- 2000, 27(54%) were belonging to Joint family, 48(96%) were non vegetarians, 21(42%) had habit of tobacco chewing, 38(76%) were married at the age of 14-16yrs, 49(98%) had no family history of genital malignancies, 50(100%) did not have post coital bleeding and 42(84%) did not have history of white discharge. In menstrual variables 44(88%) had regular menstrual cycle, 29(58%) had attained menarche at the age of 13yrs, 41(82%) had normal menstrual flow, 34(68%) were using cotton cloths during menstruation, 34(68%) were reusing cloths used during periods, 34(68%) were washing cloth with cold water and drying in sunlight, 24(48%) were changing cloths after fully soaked and 50(100%) were taking bath daily once. In sexual practice variables majority 38(76%) were exposed to sex at the age of 15-16yrs, 26(52%) were having sex once in 15 days, 26(52%) were not washing perineal area after the sex, nobody had history of multiple sexual partner, nobody used condom during sex and nobody practiced sex during menstrual periods.

**Discussion**

In the present study it was observed that out of 50 women, in experimental group in the post test, 20(40%) were in negative score, 30(60%) were in grade I PCCL or CIN-I. In control group out of 50 women in the post test it was observed that 15(30%) were in grade I PCCL or CIN-I and 35(70%) were in grade II PCCL or CIN-II.

Regarding PCCL status among rural women, the obtained mean difference in PCCL among the experimental group 4.04 (SD = 1.37) was significantly higher than the control group 0.60 (SD = 1.38), \( t = 12.488 \) (\( P < .001 \)). Therefore the null hypothesis was rejected and the dietary intervention was highly significant in reducing the PCCL among women.

Table – 3 reveals, the obtained mean difference in PCCL among the experimental group 4.04 (SD = 1.37) was significantly higher than the control group 0.60 (SD = 1.38), \( t = 12.488 \) (\( P < .001 \)). Therefore the null hypothesis was rejected and the dietary intervention was highly significant in reducing the PCCL among women.

Whereas in control group majority of women 26(52%) were in the age group of 20-30yrs, 21(42%) had higher secondary education, 25(50%) were private employees, 50(100%) were Hindus, 33(66%) were in the income range of Rs1001- 2000, 27(54%) were belonging to Joint family, 48(96%) were non vegetarians, 21(42%) had habit of tobacco chewing, 38(76%) were married at the age of 14-16yrs, 49(98%) had no family history of genital malignancies, 50(100%) did not have post coital bleeding and 42(84%) did not have history of white discharge. In menstrual variables 44(88%) had regular menstrual cycle, 29(58%) had attained menarche at the age of 13yrs, 41(82%) had normal menstrual flow, 34(68%) were using cotton cloths during menstruation, 34(68%) were reusing cloths used during periods, 34(68%) were washing cloth with cold water and drying in sunlight, 24(48%) were changing cloths after fully soaked and 50(100%) were taking bath daily once. In sexual practice variables majority 38(76%) were exposed to sex at the age of 15-16yrs, 26(52%) were having sex once in 15 days, 26(52%) were not washing perineal area after the sex, nobody had history of multiple sexual partner, nobody used condom during sex and nobody practiced sex during menstrual periods.

The finding of the study is supported by a study conducted in Brazil on Diet and serum micronutrients in relation to cervical neoplasia and cancer among low income women. Study reveals that Serum carotenoids and tocopherols are associated with risk for cervical neoplasia. Researcher evaluated the association of serum total carotene and tocopherols, and dietary intakes with the risk of newly diagnosed, histologically confirmed cervical intraepithelial neoplasia (CIN) grades 1, 2, 3 and invasive cancer in a hospital-based case-control study in São Paulo, Brazil. Sample size included 453 controls and 4 groups of cases (CIN1, \( n = 140 \); CIN2, \( n = 126 \); CIN3, \( n = 231 \); invasive cancer, \( n = 108 \)). Increasing concentrations of serum lycopene were negatively associated with CIN1, CIN3 and cancer, with odds ratios (OR) (95% CI) for the highest compared to the lowest tertile of 0.53 (0.27-1.00, \( p \) for trend = 0.05), 0.48 (0.22-1.04, \( p \) for trend = 0.05) and 0.18 (0.06-0.52, \( p \) for
trend = 0.002), respectively, after adjusting for confounding variables and HPV status. Increasing concentrations of serum alpha- and gamma-tocopherols, and higher dietary intakes of dark green and deep yellow vegetables/fruit were associated with nearly 50% decreased risk of CIN3. These results support the evidence that a healthy and balanced diet leading to provide high serum levels of antioxidants may reduce cervical neoplasia risk in low-income women.

Conclusion
Cervical cancer is one of the leading cancers among women, which affects approximately 4,90,000 women each year, resulting in approximately 2,70,000 deaths worldwide. VIA has proved to be useful as a cheap and effective screening test for cervical cancer. The overall findings of the study clearly showed that there was a significant reduction in PCCL scores after the administration of antioxidants. Thus the antioxidants is effective in reducing the PCCL among women.

References
A Descriptive Study to Assess the Knowledge and Practice Regarding Water, Sanitation and Hygiene among Women in Selected Villages of Udupi District

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Abstract

Background: Safe drinking water and basic sanitation is of crucial importance to the prevention of human health. Water can become a vehicle for transmission of feco oral group of infections, because the fecal contamination of water is common and its avoidance and subsequent purification is vigilant. One of the goal of MDG states - Halve, by 2015, the proportion of people without sustainable access to an improved water source and sanitation.

Materials and methodology: A descriptive study was undertaken among 300 samples, in adopted villages of MCON Manipal, Udupi District using structured questionnaire. SPSS 16.0 software was used for data analysis.

Results: Findings of the study showed that 42% had average knowledge and majority (75%) of the subjects followed unsafe practices on water, sanitation and hygiene. Majority (88%) of the subjects performed unskilled hand washing.

Conclusion: Water pollution is a growing hazard in many developing countries due to human activity. Water is an essential factor in the economic, social and cultural development of community. It can eliminate diseases, and improve quality of life.

Keywords: Water, sanitation, hygiene, knowledge, practice.

Introduction

WHO/UNICEF Joint Monitoring Programme for water supply and sanitation released in 2013, estimates that 36% of the world’s population – 2.5 billion people lack improved sanitation facilities and 768 million people still use unsafe drinking water sources. Poor farmers and wage earners are less productive due to illness, health systems are overwhelmed and national economies suffer.

Survey by water, sanitation and hygiene (WASH) in India (2008) estimated that with regards to sanitation that most of the India’s population (69%) did not use improved sanitation. In rural parts of India, 79% of the population used unimproved sanitation facilities. Over 50% of the India’s population defecated in the open field. The majority (88%) of the population in India had access to improved source of drinking water. One fourth of the population has water availability in their household premises. The majority (87%) of women used to collect water. Most (67%) of the Indian household do not treat drinking water in any form. Hand washing with soap and water was practiced by 53% after defecation, 38% before eating and 30% before preparing food. Report showed that most (80%) of the child’s stool was not disposed safely. Study stressed the importance of maintaining good sanitation facility and develops hygienic practices.

The Hindu newspaper reports findings of survey conducted under the Nirmal Bharath Abiyan, out of 2.26 lakh rural households, almost seven and half lakh (7,758) households in Udupi Taluk, 13,395 households in Kundapura Taluk, 4,084 households in Karkala Taluk does not have toilets. Survey stressed on importance of toilet
construction in these areas. Deshpande K, Kakkar R and Diwan V conducted a survey to assess quantity and quality of water and problems perceived by residents of Palwa village in Ujjain district. A total of 38 adult households were selected by systematic random sampling. Data was collected by interview method using a questionnaire. The findings of the study showed that majority (84%) of households did not have water sources within their household area. Most (55%) of the household had water available at a distance of more than 50 m from their house. Most of the female in the households (58%) spent 1 hour 25 minutes to collect water. The majority (61%) did not wash hands before taking water from a stored vessel. Almost all (100%) practiced filtering water by cloth or plastic sieve. The study concluded that people were not aware about water purification.

The objectives of the study was to assess the knowledge and practice on water, sanitation and hygiene, to find the association between knowledge, practice on water, sanitation and hygiene and selected demographic variables such as age, education, occupation, type of family, family income per month, information on water, sanitation and hygiene, membership in organization. The Purpose of the study was to assess the knowledge and practice regarding water, sanitation and hygiene and based on the findings to make those women sensitize on the areas where they are lacking in knowledge and the right practice to have a healthy community which is free from water borne diseases hence contributing towards the achievement of Millennium Developmental Goal - 7

Materials and methods
A survey approach was adopted with a descriptive design.

Research setting
The study was conducted in Athrady, Hirebettu and Marne villages of Udupi district.

Sample, Sample size and Sampling technique
Sample of the study included women who are involved in household work. The sample size was three hundred. Areas were selected using convenient sampling. Houses were selected by disproportionate stratified random sampling and sample was selected using purposive sampling.

Data Collection tool
Data was collected using structured questionnaire and observation checklist which was prepared by researcher.

Tool 1: Demographic proforma
Tool 2: Structured questionnaire on knowledge regarding water, sanitation and hygiene
Tool 3: Section 1 - Structured questionnaire on self-reported practice on water, sanitation and hygiene
Tool 3: Section 2 - Checklist on practices of water, sanitation and hygiene

Tool 2 - The tool was developed by the researcher to determine the knowledge of women on water, sanitation and hygiene. The tool comprised of 30 items of multiple choice questions. Each correct option was scored one and each wrong option was scored zero. Knowledge score was arbitrarily classified as good knowledge: 21-30, average knowledge: 11-20 and poor knowledge: 0 – 10. Content validity of the tool was obtained by 7 experts from the field of Community Health Nursing, Community Medicine, Public Health, Social Welfare Worker and Medical Officer of PHC. All items had 100% agreements except one item which was modified as per the suggestion from the experts. Tool was administered in local language. Reliability of knowledge questionnaire was obtained by split half method (r = 0.93)

Tool 3 Section 1 - Each item was categorized as safe practice or unsafe practice and was scored one or zero respectively. The total score of this tool was combined with the total score of tool 3 section 2 for the purpose of analysis.

Tool 3 Section 2 - The tool was developed by the researcher to observe the practices of women with regard to water, sanitation and hygiene. The tool consisted of 28 items on practices of water, sanitation and hygiene out of which one question (28th) included sub questions on steps of hand washing. Each item of the first 27 questions was categorized as safe or unsafe practice and was scored one or zero respectively. For the purpose of analysis, Tool 3
section 1 and section 2 was combined. Practice category was arbitrarily classified as safe practice: 30 – 36 and unsafe practice: 0 – 29

Question 28 on steps of hand washing was scored based on the critically important steps. The simple step was scored as one and the critically important step scored as two. The maximum possible score was twelve and the minimum score was two. Hand washing practice was arbitrarily classified as unskilled hand washing (2-11 score) and skilled hand washing (=12 score).

Content validity of the tool was obtained by 7 experts from the field of Community Health Nursing, Community Medicine, Public Health, Social Welfare Worker & Medical Officer of PHC. All items had 100% agreements with modification of some statements. Reliability of structured practice questionnaire by test retest method (r=1) and checklist on practice by inter rater reliability (r = 1).

**Data collection process**

Administrative Permission and informed consent was obtained from each subject and anonymity was maintained. Tool was administered and practices were observed and rated. Information was given on safe practices after collecting data.

Data obtained were coded and analyzed. Statistical package for social sciences software (SPSS 16.0) was used for statistical analysis of raw data. Frequency, Percentage and association were obtained.

**Results**

**Sample characteristics**

Study found that most of the women (43.7%) were in the age group of 20 – 39 years and majority of them (97%) were married and were Hindus (93.3%). Most of them (42.7%) had primary education and lived in joint family (62.7%). Majority (76.7%) were housewives. Most of them (52.7%) had APL cards and had their family income between 5000-10000 Rupees per month (50.7%). (Table 1)

**Information related to home and surrounding**

Majority of the subjects (92.7 %) have pucca house with less than 20 members in all the houses. Majority of them (99%) used open drainage method for waste water disposal. All the subjects had their water source within 500 meters of distance from their house. Majority of the subjects (92.3%) had water available in all 500 meters of distance from their house. Majority of the subjects (97.7%) had latrines in their house with distance between latrine pit and well was less than 30 feet (34%). In majority of the houses females (89.3%) drew water from the well. Most of subjects (51.3%) had no knowledge on water, sanitation and hygiene, amongst the subject who had knowledge, (15 %) subjects had knowledge from their friends and relatives. Majority of them (85.7 %) were not members of any organization. (Table 2 and 3)

**Description of knowledge score on water, sanitation and hygiene.**

The study findings revealed that out of 300 subjects, 40% had good knowledge, 42% had average knowledge and 18% had poor knowledge on water, sanitation and hygiene. (Figure 1)

**Description of practices on water sanitation and hygiene.**

Study findings revealed that most of the well (66.3%) has cemented compound. Most of the subjects (66.3%) use handled jug to take water from water storing drum, majority (70%) uses boiled or filtered water for drinking. Most of the toilets (68.3 %) are well ventilated, Majority of the subjects (83.7%) cleans water storing vessel daily. Majority (70%) practiced hand washing with soap and water after defecation (Table 4)

**Description of practice score on water, sanitation and hygiene.**

Findings of the study revealed that majority (75 %) of the subjects followed unsafe practices on water, sanitation and hygiene. (Figure 2)

**Description of hand hygiene practice**

The study found that majority (88 %) of the subjects performed unskilled hand washing. (Figure 3)

**Association between knowledge and practice on water, sanitation and hygiene.**
Study found that there is significant association between knowledge and age ($\chi^2=4.60; p <0.05$), education ($\chi^2=1.34; p <0.05$), occupation ($\chi^2=1.09; p<0.05$), family income per month ($\chi^2=0.9; p < 0.05$), information on water, sanitation and hygiene ($\chi^2=1.38, p< 0.05$) (Table 6).

Study also found that there is significant association between practice and age ($\chi^2=0.89; p < 0.05$), education ($\chi^2=5.144; p <0.05$), occupation ($\chi^2=2.85, p<0.05$), family income per month ($\chi^2=2.86; p < 0.05$), information on water, sanitation and hygiene ($\chi^2=1.01, p< 0.05$) (Table 5 and 6).

**Table 1:** Demographic characteristics of samples n=300

<table>
<thead>
<tr>
<th>Demographic variables</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (in years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-39</td>
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<tr>
<td>40-59</td>
<td>124</td>
<td>41.3</td>
</tr>
<tr>
<td>Above 60</td>
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<td>15</td>
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<tr>
<td>Married</td>
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<td>97</td>
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<tr>
<td>Unmarried</td>
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<td>3</td>
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<tr>
<td><strong>Education</strong></td>
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<tr>
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<td>6</td>
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<tr>
<td>Primary Schooling</td>
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<td>High school</td>
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<td>More than PUC</td>
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<tr>
<td><strong>Religion</strong></td>
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<tr>
<td>Hindu</td>
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</tr>
<tr>
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<td>5</td>
</tr>
<tr>
<td>Muslim</td>
<td>5</td>
<td>1.7</td>
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<td><strong>Type of family</strong></td>
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<tr>
<td>Joint</td>
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<td><strong>Occupation</strong></td>
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<tr>
<td>Housewife</td>
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<tr>
<td>Skilled profession</td>
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<td>7.0</td>
</tr>
<tr>
<td>Unskilled profession</td>
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<td>16.3</td>
</tr>
<tr>
<td><strong>Type of Ration card</strong></td>
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<tr>
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<td>0.7</td>
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<tr>
<td>APL</td>
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<tr>
<td>BPL</td>
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<td>47</td>
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<tr>
<td><strong>Family income per month</strong></td>
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<tr>
<td>2000 – 5000</td>
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<td>23</td>
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<tr>
<td>5000 – 10000</td>
<td>152</td>
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</tr>
<tr>
<td>10000 – 15000</td>
<td>44</td>
<td>14.7</td>
</tr>
<tr>
<td>Above 15000</td>
<td>35</td>
<td>11.7</td>
</tr>
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</table>

**Table 2:** Information related to home and surrounding n=300

<table>
<thead>
<tr>
<th>Variables</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Housing</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Katcha</td>
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<td>0.3</td>
</tr>
<tr>
<td>Pucca</td>
<td>278</td>
<td>92.7</td>
</tr>
<tr>
<td>Semi pucca</td>
<td>21</td>
<td>7.0</td>
</tr>
<tr>
<td><strong>Number of people in household</strong></td>
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<td></td>
</tr>
<tr>
<td>Less than 10</td>
<td>297</td>
<td>99</td>
</tr>
<tr>
<td>10-20</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td><strong>Method of waste water disposal</strong></td>
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<td></td>
</tr>
<tr>
<td>Open</td>
<td>297</td>
<td>99</td>
</tr>
<tr>
<td>Closed</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td><strong>Distance of water source from shelter</strong></td>
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<td></td>
</tr>
<tr>
<td>Less than 100 feet</td>
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<td>96.66</td>
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<tr>
<td>&gt;100 feet – 200 Feet</td>
<td>10</td>
<td>3.33</td>
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<tr>
<td><strong>Availability of water in all seasons</strong></td>
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<td></td>
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<tr>
<td>Yes</td>
<td>277</td>
<td>92.3</td>
</tr>
<tr>
<td>No</td>
<td>23</td>
<td>7.7</td>
</tr>
<tr>
<td><strong>Presence of latrine</strong></td>
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<td></td>
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<tr>
<td>Yes</td>
<td>293</td>
<td>97.7</td>
</tr>
<tr>
<td>No</td>
<td>7</td>
<td>2.3</td>
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**Table 3:** Information related to home and surrounding n=300

<table>
<thead>
<tr>
<th>Variables</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Distance of latrine from well</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No latrine</td>
<td>7</td>
<td>2.3</td>
</tr>
<tr>
<td>More than 30 meters</td>
<td>191</td>
<td>63.7</td>
</tr>
<tr>
<td>Less than 30 meters</td>
<td>102</td>
<td>34</td>
</tr>
<tr>
<td><strong>Person who draws water from the well</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>32</td>
<td>10.7</td>
</tr>
<tr>
<td>Female</td>
<td>268</td>
<td>89.3</td>
</tr>
<tr>
<td><strong>Kids defecation practice</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toilet</td>
<td>249</td>
<td>83</td>
</tr>
<tr>
<td>Outside</td>
<td>51</td>
<td>17</td>
</tr>
<tr>
<td><strong>Information on Water, sanitation and hygiene</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>146</td>
<td>48.7</td>
</tr>
<tr>
<td>Absent</td>
<td>154</td>
<td>51.3</td>
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<td><strong>Source of information</strong></td>
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<td>No source</td>
<td>154</td>
<td>51.3</td>
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<tr>
<td>Panchayath</td>
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<td>4.3</td>
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<tr>
<td>Friends/ relatives</td>
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<td>15</td>
</tr>
<tr>
<td>Health worker</td>
<td>32</td>
<td>10.7</td>
</tr>
<tr>
<td>Newspaper</td>
<td>32</td>
<td>10.7</td>
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<tr>
<td>TV</td>
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<tr>
<td><strong>Member of organization</strong></td>
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<td></td>
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<tr>
<td>Not a member</td>
<td>257</td>
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</tr>
<tr>
<td>Group member</td>
<td>43</td>
<td>14.3</td>
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</table>
Table 4: Description of practices related to water, sanitation and hygiene

<table>
<thead>
<tr>
<th>Variables</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compound for well</strong></td>
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<td></td>
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<tr>
<td>Cemented compound</td>
<td>199</td>
<td>66.3</td>
</tr>
<tr>
<td>Plants/Mud compound</td>
<td>101</td>
<td>33.7</td>
</tr>
<tr>
<td><strong>Uses handled jug for taking water from drum</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>101</td>
<td>33.7</td>
</tr>
<tr>
<td>No</td>
<td>199</td>
<td>66.3</td>
</tr>
<tr>
<td><strong>Use of boiled/ filtered water for drinking</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>210</td>
<td>70</td>
</tr>
<tr>
<td>No</td>
<td>90</td>
<td>30</td>
</tr>
<tr>
<td><strong>Ventilation of sanitary toilet</strong></td>
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<td></td>
</tr>
<tr>
<td>Well ventilated</td>
<td>205</td>
<td>68.3</td>
</tr>
<tr>
<td>Poor ventilation</td>
<td>95</td>
<td>31.7</td>
</tr>
<tr>
<td><strong>Cleans water storing vessel daily</strong></td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>251</td>
<td>83.7</td>
</tr>
<tr>
<td>No</td>
<td>49</td>
<td>16.3</td>
</tr>
<tr>
<td><strong>Hand washing with soap and water after defecation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>210</td>
<td>70</td>
</tr>
<tr>
<td>No</td>
<td>90</td>
<td>30</td>
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</table>

Table 5: Chi square value showing association between knowledge and demographic variables.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Good knowledge</th>
<th>Average knowledge</th>
<th>Poor knowledge</th>
<th>χ²</th>
<th>df</th>
<th>p value</th>
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</thead>
<tbody>
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<td></td>
<td></td>
</tr>
<tr>
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<td>11</td>
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<tr>
<td>5.Information on Water, sanitation and hygiene</td>
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<td>Present</td>
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Table 6: Chi square value showing association between practice and demographic variables.

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<th>Unsafe Practice</th>
<th>$\chi^2$</th>
<th>df</th>
<th>p value</th>
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<tr>
<td>3. Occupation</td>
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<td>3. Type of family</td>
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<td>4. Family income per month</td>
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<td>32</td>
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</table>

Discussion

Findings of the present study showed that Majority (89.3%) of the women used to draw water from well. Most of the subjects (66.3%) used handled jug to take water from water storing drum, majority (70%) uses boiled or filtered water for drinking. Majority had access to water less than in less than 100 feet distance. Majority (97.7%) had toilet. Most of the toilets (68.3 %) are well ventilated, Majority of
the subjects (83.7%) cleans water storing vessel daily. Majority (70%) practice hand washing with soap and water after defecation. The findings of the present study is supported by cross sectional study conducted by Hazarika J on Water handling and sanitation practices among mothers of under-fives in slum population, the findings of which showed that most of the women (61.5%) used to dip hand to take water from water storing container, Majority (85.5%) did not treat water to make it safer for drinking, Majority (70.5%) respondents defecated open field. Most of them (60.5%) washed hands with soap and water after defecation).

Present study showed that mostly women used to fetch (89.3%) water, majority (96.66%) had water source available within 100 feet distance. All the houses (100%) water was stored in closed container, majority (97.7%) had toilet in their household and it was kept clean (75.7%). The finding is supported by cross sectional study conducted by A I Mohammed et al on Access to safe drinking water and availability of environmental sanitation facilities among Dukem town households in Ethiopia. Samples were selected by stratified random sampling. Data was collected using structured questionnaire and face to face interview and observation on information on sanitary facilities and environmental conditions of households the findings of which showed that, majority (82.6%) of the women used to fetch water, water was available in less than 200 meter distance, majority (93.2%) covered their water storing container, majority (70.1%) had toilet in their household, majority (85%) maintained cleanliness of toilet.

The study findings are useful for the public health nurses to ensure that the hygienic practices are maintained by the households during their home visits and also to plan awareness programme on water, sanitation and hygiene. The study findings gives an insight to the nurse administrators to develop a framework through which employees assess the environmental health needs.

The study findings cannot be generalized as the results are from the small representative group. Hence it is better to conduct study on larger sample. The study can be conducted among urban and rural people to compare the knowledge and practice on water, sanitation and hygiene.

Conclusion

The findings of the study showed that majority of samples had average knowledge and unsafe practices on water, sanitation and hygiene. The study also showed that majority of subjects followed unskilled hand washing. Study found significant association between knowledge, practice and age, education, occupation, family income per month and information on water, sanitation and hygiene. The study inferred that as knowledge increases practice improves.

References

Effect of Instructional Module on Drug Adherence in Terms of Attitude among Patients with Schizophrenia

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Abstract
Quasi experimental study was done with 40 samples using instructional module on drug adherence. The selection of the sample was done by non probability purposive sampling technique. The data were analyzed through descriptive and inferential statistical method. The findings of the study revealed that the instructional module helped the patients with Schizophrenia to develop a positive attitude towards drug adherence. The research hypothesis retained for this study also showed significant improvement in the level of attitude towards drug adherence.

Keywords: Drug adherence, attitude, schizophrenia.

Introduction
“Heaven never helps man who will not act” - Sophocles

Schizophrenia is the most common disorder with psychotic symptoms and ranks in the top 10 disease burden. The life span of patients with schizophrenia is reduced by 10 years. Onset of symptoms typically occurs in young adulthood with approximately 0.4 to 0.6%. Schizophrenia affects about seven per thousand of the adult population, mostly in the age group of 15-35 years. According to WHO 24 million people are affected. Among that 50% are not receiving appropriate care, 90% of untreated schizophrenia are present in developing countries. Of all the mental illnesses responsible for suffering in society, Schizophrenia probably causes more lengthy hospitalization, more chaos in family life more exorbitant costs to individuals and governments and more fears than any other illness. Because of such an enormous threat to life and happiness and because its causes are an unsolved puzzle, it has probably been studied more than any other mental disorder.

Background of the study
National institute of mental health (1996) states that worldwide 5 million people suffering from Schizophrenia and especially in India 87 million people are living with diagnosis of Schizophrenia. It is highly treatable, the treatment success rate with antipsychotic medications and psychosocial therapy being as high as 60%. The first line of psychiatric treatment for Schizophrenia is antipsychotic medication. These drugs are highly effective which can reduce the positive symptoms of psychosis. Most of the antipsychotics take around seven to fourteen days to have their main effect. 70% of people using medications for Schizophrenia improve in their symptoms and also prevent relapses. Boyd (2000) stated that major reason for relapse is non adherence with the medication regiment due to poor knowledge and attitude towards antipsychotic drugs. 40% of patients with Schizophrenia are at much greater risk for hospitalization due to poor adherence to antipsychotic drugs. Thus by providing proper information about the action, importance, side effects and management through instructional module, the patients with Schizophrenia are helped to improve the knowledge and attitude toward
drugs adherence to prevent relapse.

**Review of literature:** Novak, L, Svab, V. (2009) conducted a study on antipsychotic drugs side effects, and their influence on stigma of mental illness. Results suggested that the patients felt most stigmatized in the areas of employment and occupation. They repeatedly skipped or discontinued regular medication due to side effects. Adweuya, B. (2006) conducted a study on attitude towards anti-psychotics among out-patients with Schizophrenia. Drug attitude inventory (10-item) was used. The overall results showed that the patients had a good attitude towards antipsychotic medication. The factors significantly associated with poor attitudes towards medication include presence of symptoms. Chabannes, J.P, et. al., (2008) conducted a study on relapse prevention by a new educational programme in patients with Schizophrenia treated with the same antipsychotic drug. Results revealed that the relapse risk was significantly reduced for patients who followed 7 modules.

**Objectives**
1. Assess the level of attitude towards drug adherence among patients with schizophrenia.
2. Evaluate the effect of instructional module on drug adherence in terms of attitude among patients with schizophrenia.
3. Compare the attitude towards drug adherence among patients with schizophrenia of pre and post score in both groups.
4. Associate the level of attitude towards drug adherence with selected demographic variables

**Hypothesis**
There is a significant difference in attitude towards the drug adherence among patients with schizophrenia who received instructional module than those who did not receive instructional module.

**Assumptions**
1. Patients improve their knowledge and attitude through teaching.
2. Patient with positive attitude may ensure regular follow

**Methodology**
Quasi experimental study design was selected. The selection of the sample was done by non probability purposive sampling technique and the sample size consists of 40 schizophrenic patients discharged from Psychiatric outpatient department of SRH, Porur. The patients who scored V and V1 as per Ahuja’s scale were selected for the study. Drug attitude inventory was used to assess the attitude towards antipsychotic drugs. Instructional module regarding importance, side effects and management of antipsychotic drugs were explained and given.

**A. Criteria for Sample Selection**

1. **Inclusion Criteria**
   a. Both male and female patients who were diagnosed as Schizophrenia based on ICD – 10 classifications and discharged from psychiatric ward at Sri Ramachandra Hospital, Porur, Chennai.
   b. Patients who scored insight level of V and VI as per Ahuja’s insight scale.
   c. Patients who had a relapse of Schizophrenia.

2. **Exclusion Criteria**
   1. Patients who were suffering from psychiatric illness other than Schizophrenia.
   2. Patients who were not willing to participate in this study.

**Description of the tool.**

**Section A:** Demographic variables of the patients with Schizophrenia were in relation to age, sex, residence, education, occupation, income, marital status, religion and duration of illness.

**Section B:** Drug attitude inventory was used to assess the level of attitude towards drug adherence among patients with schizophrenia. The drug attitude inventory scale is a standardized tool which was developed by Hogan T.P and Awad A.G. It has been widely used by the researcher. The total number of items were 30. The scale has 15 positive and 15 negative items that will be scored as true and 15 scored as false.

A negative total score means a negative subjective response (non-compliant). The correct response was
and VI as per Ahuja’s scale were selected for the study. And verbal consent was obtained initially. Pre test was conducted to assess the level of attitude towards drug adherence by using drug attitude inventory. It took 15 minutes for the assessment with each participant. For the experimental group, instructional module about the importance, side effects and management of antipsychotic drugs were explained and given. It took 25 minutes. On the 15th day the post test was conducted to assess the level of attitude towards drug adherence using drug attitude inventory. No intervention was used for the control group.

**Findings**

The frequency and percentage distribution of demographic variables of the 40 patients with Schizophrenia in the experimental and control group. In the experimental group, 10 (50%) were in the age group of 21-30 years and two (10%) were in the age group of 41-50 years and 51-60 years. In control group, 10 (50%) were in the age group of 21-30 years and three (15%) were in the age group of 41-50 years. Regarding educational status, most patients, six (30%) had higher secondary education, six (30%) had high school education and one (5%) was illiterate in the experimental group. In the control group, eight (40%) were graduates and one (5%) was illiterate. With regard to family income, 11 (55%) belonged to Rs 2001-3000/- and one (5%) belonged < Rs1000/- in the experimental group. In the control group 12 (60%) belonged to Rs. 2001-3000/- and one (5%) belonged to < Rs.1000. With regard to the duration of the illness, 12 (60%) suffered for 13 months-24 months and one (5%) suffered for 25 months – 36 months in the experimental group. In the control group, nine (45%) subjects suffered for a period of 13 months -24 months and one (5%) suffered for 25 months – 36 months in the experimental group. In the control group, nine (45%) subjects suffered for a period of 13 months -24 months and four (20%) suffered for a period of 25 months -36 months.

**Table 1**: Frequency and Percentage distribution of the level of attitude towards drug adherence among patients with Schizophrenia in control and experimental group. (N=40).

<table>
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<tr>
<th>Level of Attitude</th>
<th>Control group (n=20)</th>
<th>Experimental group (n=20)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Pre test</td>
<td>Post test</td>
</tr>
<tr>
<td>No</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Negative Attitude</td>
<td>14 70</td>
<td>13 65</td>
</tr>
<tr>
<td>Positive Attitude</td>
<td>3 15</td>
<td>4 20</td>
</tr>
<tr>
<td>Neutral Attitude</td>
<td>3 15</td>
<td>3 15</td>
</tr>
</tbody>
</table>
In control group, during the pre test 14 (70%) showed negative attitude, 3 (15%) expressed positive and neutral attitude while 13 (65%) exhibited negative attitude, four (20%) showed positive attitude, and three (15%) showed neutral attitude during the post test. In experimental group, 17 (85%) revealed negative attitude, two (10%) showed positive attitude and one (5%) had neutral attitude in the pre test. The post test exhibited all the 20 (100%) gained positive attitude.

The Mean difference, Standard deviation and paired ‘t’ value of attitude score towards drug adherence among patients with Schizophrenia in experimental and control group. It reveals that there was a high statistically significant difference at the level of \( p < 0.001 \) in experimental group. Figure 1 shows that the participants in experimental group developed positive attitude after receiving instructional module with a mean difference of 16.50.

The paired ‘t’ test analysis shows \( t = 8.918 \), which proves that there was a statistically high significance in experimental group during the post test at the level of \( p < 0.001 \) and there was no significance in the control group. There was a high statistically significant difference at the level of \( p < 0.001 \) in experimental group. Anova shows that there was statistically significant association between the level of attitude towards drug adherence and income at the level of \( p < 0.05 \).

Discussion
The findings of the study revealed that the instructional module helped the patients with Schizophrenia to develop a positive attitude towards drug adherence. The research hypothesis retained for this study also showed significant improvement in the level of attitude towards drug adherence among patients with Schizophrenia after they received instructional module. Therefore the hypothesis is accepted.

Nursing Implications
Psychiatric nurse plays a major role in collaborating with other mental health team members. Patients who had positive attitude will adhere to the antipsychotic drugs. The psychiatric nurse plays a major role in educating the psychiatric patients about the importance, side effects and the management of antipsychotic drug which improve their attitude towards drug adherence.

1. Nursing practice
   a. Hospital: Most patients with psychiatric problems are frequently admitted in the psychiatric wards due to poor drug adherence. Relapse occurs with the patients who have negative attitude towards antipsychotic drugs. The nurse needs enthusiasm to provide information about the importance, side effects and management of antipsychotic drugs which would improve the positive attitude among patients with Schizophrenia and thereby prevent relapse.
   b. Community: The community mental health nurse should have a thorough knowledge about the antipsychotic drugs management and its importance. She should teach not only the patient but also the family members. Family members play a major role in providing medication in proper time without fail which prevents relapse.
   c. Nursing Education: Nurse educator and student nurses must have awareness about mental illness and their drug management. In schools and colleges of nursing, teachers should come forward and encourage the students in providing psycho education about the importance, side effects and management of antipsychotic drugs. Nursing educational institutions can organize educational programmes like continuing nursing educational programmes, workshops, seminar, and conferences to the nursing students on antipsychotic drug management which would help them to enhance their nursing care in ward set up.

2. Nursing administration: The nursing administration should organize in-service training programme on antipsychotic drug management for the nurses, so that they could provide information to the patients and the family members. The present study showed that the patients developed positive attitude after they received the instructional module. So the nursing administrator
intends to communicate the findings of this study to staff nurses, so that they could incorporate this to the patients with Schizophrenia. She can motivate the nurses to attend the classes on antipsychotic drug management.

3. **Nursing research**: The staff nurses are to be educated on antipsychotic drug management, in turn, they could educate the patients, their family members and enrich the evidence based care. Nurses can also be involved in research activities and implement their findings with other patients with mental illness. The institutional authorities should provide opportunity and necessary support to do research on antipsychotic drug management and its importance to improve the aspect of patient’s attitude.

**Recommendations for future research**
1. This study can be replicated on a larger sample size with extended period of time.
2. This study can be conducted by using experimental design.
3. Psycho education can include innovative technologies like use of video shows.
4. This study can be compared between the patients with Schizophrenia and other mental illness.
5. This similar study can be conducted in community settings.

**References**
Introduction
Puberty is a period in the developmental span when the individual changes from an asexual being to a sexual being. It is a period of rapid physical change and personality growth when individual achieves nearly the adult bodily stature. The girls begin their preadolescent growth spurt at about 10 years of age and boys at about 12 years of age. Girls and boys approach the end of puberty between 12-14 and 13-15years respectively.¹

During puberty the biological changes reach a climax and there is sexual maturity in both boys and girls. The pubescent girls and boys will have more concern about their bodily changes, which will bring about psychological consequences. Among many adjustments the adolescents must make, the most important is learning about the change in the body. With the onset of puberty the feeling, questions and concern about bodily appearance begin to occupy a central place in the life of the individual. All physical characteristics require extraordinary attention and examination during this phase. This is a time, which the individual feels himself different from others and undesirable characteristics put the adolescent at risk for teasing and ridicule.²

Adolescence is regarded as unique phase of human development; adolescents are important resources of any country. They have successfully passed the adversaries of early childhood and are on the way to adulthood.³

Anxiety & Coping Patterns Regarding Pubertal Changes among Pre-Adolescent Girls of Udupi Taluk, Karnataka

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E-mail: anjeline.d@manipal.edu

Abstract
Background: Puberty is a period in the developmental span when the individual changes from an asexual being to a sexual being.

Objectives: The present study was aimed to assess the anxiety and coping pattern regarding pubertal changes among pre-adolescents girls in selected schools of Udupi Taluk, Karnataka.

Materials and methods: The study included 540 pre-adolescent girls of age group (10-12years) from selected schools of Udupi Taluk by cluster random sampling technique. Data was collected using structured questionnaires.

Results: The study showed that out of 231 pre-adolescents who attained menarche (55%) had moderate anxiety and 52.4% had adaptive coping pattern. Among 309 pre-adolescents who did not attain menarche, 62.1% had moderate level of anxiety and 53.4% had adaptive coping pattern regarding pubertal changes. It also showed that there was a negative correlation between anxiety and coping pattern of the pre-adolescent girls, r=-0.754.

Conclusion: The study concluded that pre-adolescent girls have moderate level of anxiety and adaptive coping pattern regarding pubertal changes and it also showed that when anxiety increases coping pattern decreases. Majority of the respondents had moderate level of anxiety and adaptive coping pattern.

Keywords: Anxiety, puberty, coping pattern, pre-adolescents.
also receive adequate attention as a preparation for pubertal changes and menarche.\(^4\)

A correlative study to assess the knowledge and anxiety of pre-adolescents related to pubertal growth in a selected school of Udupi district among 170 pre-adolescents showed that 55.88% had not received adequate parental preparation on pubertal growth. 61.8% had only average knowledge and majority 154 (90.58%) had moderate anxiety of which 83 were girls and 71 were boys. The data also showed that 16 (9.41%) had severe anxiety of which 8 were girls and 8 were boys.\(^5\)

Kumar et al investigated 1000 girls and boys of the age group 13-19 years drawn from eight selected institutions to determine the pattern of anxiety related to their own growth during puberty at Punjab. The study results showed that a larger number of subjects were needlessly troubled on account of viewing the normal variations in the rate of physical development as abnormal variations. Boys surpassed girls in the degree of concern expressed over various parameters of pubertal growth and development. Height, shoulder width, and pubic hair growth were the principal areas of concern in boys and menstruation, height and weight in girls.\(^6\)

A descriptive comparative study in Punjab about knowledge and coping patterns among 200 adolescents regarding pubertal changes showed that most of the adolescents were having good knowledge. As per comparison, female adolescents (72%) were having better knowledge than male adolescents (68%). In terms of coping, male adolescents (92%) had more adaptive coping patterns than female (22%) adolescents. The study concluded that there is a need to educate the adolescents especially females regarding pubertal changes before the onset of puberty. This may improve their coping ability in future and can lead a healthy life.\(^6\)

Mehta M, Chugh G and Pandey P investigated developmental changes and gender differences in the experience of stress and coping strategies among children. About 2000 school children in the age of 8-14 years from different schools of Delhi were administered scales to measure physical and psychological symptoms of stress, stressful life events as well as their coping strategies. The study revealed that females had higher physical as well as psychological manifestation of stress and had somewhat higher levels of daily hassles contributing to their stress and girls make more use of seeking social support and problem solving as coping strategies when compared to boys. The study concluded that females are at higher risk of taking stress and they are more anxious about the changes occurring in their body.\(^7\)

Studies have shown that there is lack of adequate information about pubertal changes and parental guidance to meet with changes in pubertal period. This leads to anxiety and misconceptions in the mind of young adolescents especially females which hinders their healthy growth. The purpose of the study was to assess the anxiety and coping pattern regarding pubertal changes among pre-adolescent girls and to provide an informational pamphlet which will help to reduce the anxiety and to improve the coping pattern and adaptation in future.

The objectives of the study were to assess and determine the relationship between anxiety and coping pattern regarding pubertal changes among preadolescent girls who attained and did not attain menarche.

**Material and Method**

The conceptual framework adopted for the study was Betty Neuman’s System Model.\(^8\)

Descriptive survey was adopted and study setting was higher primary schools of Udupi Taluk.

Cluster random sampling was used to select the schools. Study was conducted among 540 girls from 12 higher primary schools. The sample size was calculated at 95% confidence interval. The related precision was taken at 2%. The divisions of classes 5\(^{th}\), 6\(^{th}\), and 7\(^{th}\) are considered as clusters and samples were all the female preadolescents in the selected division who met the sampling criteria. Ethical permission was obtained from Institutional Ethics Committee. Assent from the participants was obtained and
parents’ consent was taken prior to the study. Confidentiality of the information provided by the respondents was assured to them by taking down the roll numbers.

**Data collection instruments**

**Tool 1**: Demographic proforma: It included 15 items regarding background information. Items included were age, class of study, educational and occupational status of the parents’, birth order, family income, source of information and attainment of menarche.

**Tool 2**: Anxiety scale was developed by the researcher. It consists of 33 items in which 4 items were exclusively for the pre-adolescents girls who attained menarche. It was a 3 point rating scale with three alternatives never, sometimes, always. A score of 69 to 87 was considered as severe anxiety, 49 to 68 as moderate anxiety and 29 to 48 as mild anxiety. To ensure the content validity it was given to 9 experts from the field of mental health nursing, child health nursing and OBG nursing. Reliability was computed using Cronbach’s Alpha and r was 0.76.

**Tool 3**: Coping scale consists of 29 items regarding various coping pattern adopted by the pre-adolescents. The areas selected were self-acceptance, avoidance, spiritual-positive coping, seeking social support and positive reappraisal. It was 4 point likert scale with four alternatives namely strongly agree, agree, disagree and strongly disagree. To ensure the content validity it was given to 9 experts from the field of mental health nursing, child health nursing and OBG nursing. Reliability was computed using Cronbach’s Alpha and r was 0.71.A score between 73 to 116 were considered as adaptive coping pattern and 29 to 72 as maladaptive coping pattern.

**Tool 4**: Opinionnaire regarding informational pamphlet provided to the participants. It consisted of 10 items to get their opinion on informational pamphlet.

The data was collected from the samples and then informational pamphlet was distributed to all the samples.

The statistical analysis was done using SPSS version 16. Frequency, percentage, chi-square and spearman’s rho were the statistical tests used for the data analysis with the level of significance at 0.05.

**Results**

**Sample characteristics**

Demographic profile of subjects is presented in Table 1.

**Table 1**: Frequency and percentage distribution of sample characteristics. (n=540)

<table>
<thead>
<tr>
<th>Sample characteristics</th>
<th>Frequency (F)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age in years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. 10</td>
<td>170</td>
<td>31.5</td>
</tr>
<tr>
<td>B. 11</td>
<td>184</td>
<td>34.1</td>
</tr>
<tr>
<td>C. 12</td>
<td>186</td>
<td>34.4</td>
</tr>
<tr>
<td>2. Class of study</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. 5</td>
<td>180</td>
<td>33.3</td>
</tr>
<tr>
<td>B. 6</td>
<td>180</td>
<td>33.3</td>
</tr>
<tr>
<td>C. 7</td>
<td>180</td>
<td>33.3</td>
</tr>
<tr>
<td>3. Father’s educational status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. No formal education</td>
<td>25</td>
<td>4.6</td>
</tr>
<tr>
<td>B. Primary</td>
<td>217</td>
<td>40.2</td>
</tr>
<tr>
<td>C. Secondary</td>
<td>154</td>
<td>28.5</td>
</tr>
<tr>
<td>D. Pre-university</td>
<td>85</td>
<td>15.7</td>
</tr>
<tr>
<td>E. Diploma</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>F. Degree &amp; above</td>
<td>48</td>
<td>8.9</td>
</tr>
<tr>
<td>4. Mother’s educational status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. No formal education</td>
<td>47</td>
<td>8.7</td>
</tr>
<tr>
<td>B. Primary</td>
<td>217</td>
<td>40.2</td>
</tr>
<tr>
<td>C. Secondary</td>
<td>156</td>
<td>28.9</td>
</tr>
<tr>
<td>D. Pre-university</td>
<td>74</td>
<td>13.7</td>
</tr>
<tr>
<td>E. Diploma</td>
<td>8</td>
<td>1.5</td>
</tr>
<tr>
<td>F. Degree &amp; above</td>
<td>38</td>
<td>7</td>
</tr>
<tr>
<td>5. Father’s occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Unemployed</td>
<td>5</td>
<td>0.9</td>
</tr>
<tr>
<td>B. Farmer</td>
<td>35</td>
<td>6.5</td>
</tr>
<tr>
<td>C. Business</td>
<td>146</td>
<td>27.0</td>
</tr>
<tr>
<td>D. Skilled</td>
<td>126</td>
<td>23.9</td>
</tr>
<tr>
<td>E. Professional</td>
<td>72</td>
<td>13.3</td>
</tr>
<tr>
<td>F. Semi skilled</td>
<td>156</td>
<td>28.4</td>
</tr>
<tr>
<td>6. Mother’s occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. House wife</td>
<td>345</td>
<td>63.9</td>
</tr>
<tr>
<td>B. Semi skilled</td>
<td>133</td>
<td>24.6</td>
</tr>
<tr>
<td>C. Business</td>
<td>19</td>
<td>3.5</td>
</tr>
<tr>
<td>D. Skilled</td>
<td>19</td>
<td>3.5</td>
</tr>
<tr>
<td>E. Professional</td>
<td>24</td>
<td>4.4</td>
</tr>
<tr>
<td>7. Religion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Hindu</td>
<td>359</td>
<td>66.5</td>
</tr>
<tr>
<td>B. Muslim</td>
<td>137</td>
<td>25.4</td>
</tr>
<tr>
<td>C. Christian</td>
<td>44</td>
<td>8.1</td>
</tr>
<tr>
<td>Sample characteristics</td>
<td>Frequency (F)</td>
<td>Percentage (%)</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------------</td>
<td>----------------</td>
</tr>
<tr>
<td>8. Type of family</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Extended</td>
<td>90</td>
<td>16.7</td>
</tr>
<tr>
<td>B. Joint</td>
<td>116</td>
<td>21.5</td>
</tr>
<tr>
<td>C. Nuclear</td>
<td>334</td>
<td>61.9</td>
</tr>
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<td>9. Birth order</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. 1</td>
<td>215</td>
<td>39.8</td>
</tr>
<tr>
<td>B. 2</td>
<td>232</td>
<td>43.0</td>
</tr>
<tr>
<td>C. 3</td>
<td>71</td>
<td>13.1</td>
</tr>
<tr>
<td>D. 4 &amp; above</td>
<td>22</td>
<td>4.1</td>
</tr>
<tr>
<td>10. Total monthly family income in rupees</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. &lt;2000</td>
<td>205</td>
<td>38.0</td>
</tr>
<tr>
<td>B. 2000-4000</td>
<td>161</td>
<td>29.8</td>
</tr>
<tr>
<td>C. 4001-6000</td>
<td>91</td>
<td>16.9</td>
</tr>
<tr>
<td>D. 6001 &amp; above</td>
<td>83</td>
<td>15.4</td>
</tr>
<tr>
<td>11. Source of health related information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. News paper</td>
<td>44</td>
<td>8.1</td>
</tr>
<tr>
<td>B. Magazines</td>
<td>24</td>
<td>4.4</td>
</tr>
<tr>
<td>C. Radio</td>
<td>24</td>
<td>4.4</td>
</tr>
<tr>
<td>D. Television</td>
<td>174</td>
<td>32.2</td>
</tr>
<tr>
<td>E. Cinema</td>
<td>4</td>
<td>0.7</td>
</tr>
<tr>
<td>F. Computer/ Internet</td>
<td>15</td>
<td>2.8</td>
</tr>
<tr>
<td>G. Teachers</td>
<td>213</td>
<td>39.4</td>
</tr>
<tr>
<td>H. Friends</td>
<td>42</td>
<td>7.8</td>
</tr>
<tr>
<td>12. Does your mother explain to you about menstruation/pubertal changes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Yes</td>
<td>454</td>
<td>84.1</td>
</tr>
<tr>
<td>B. No</td>
<td>86</td>
<td>15.9</td>
</tr>
<tr>
<td>13. Specify the source of information regarding menstruation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Mother</td>
<td>434</td>
<td>80.4</td>
</tr>
<tr>
<td>B. Sibling</td>
<td>11</td>
<td>2.0</td>
</tr>
<tr>
<td>C. Friends</td>
<td>49</td>
<td>9.1</td>
</tr>
<tr>
<td>D. Father</td>
<td>6</td>
<td>1.1</td>
</tr>
<tr>
<td>E. Neighbour</td>
<td>5</td>
<td>0.9</td>
</tr>
<tr>
<td>F. No information</td>
<td>3</td>
<td>6.5</td>
</tr>
<tr>
<td>14. Have you attained menarche</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Yes</td>
<td>231</td>
<td>42.8</td>
</tr>
<tr>
<td>B. No</td>
<td>309</td>
<td>57.2</td>
</tr>
<tr>
<td>15. If yes, when did you attain? (mention the age at menarche)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. 10</td>
<td>39</td>
<td>16.88</td>
</tr>
<tr>
<td>B. 11</td>
<td>98</td>
<td>42.42</td>
</tr>
<tr>
<td>C. 12</td>
<td>94</td>
<td>40.69</td>
</tr>
</tbody>
</table>

The data presented in table 1 reveals that out of 540 samples, 186(34.4%) respondents were in the age group of 12 years. With respect to parents’ educational status, primary education comprised of highest percentage 217(40.2%). In majority of the respondents father’s occupation was semiskilled type and mothers were housewives, 345 (63.9%). Considering the data on religion most of the respondents were of Hindu religion 359(66.5%) and majority of the respondents were from nuclear family 334(61.9%). With regard to data on birth order most of the respondents belong to 2nd birth order 232(43.0%). In majority of the respondents total monthly income is <2000, 205(38%). Teachers 213(39.4%) were the source of information for most of the sample. In majority of the respondents mother explained to them regarding menstruation/pubertal changes 454(84.1%). Majority of the respondents have not attained the menarche 309(57.2%) and majority who attained menarche are at the age of 11 years, 98(18.1%).

**Anxiety** : Results showed that out of 231 pre-adolescents who attained menarche, 15(6.5%) had severe anxiety, 127 (55%) had moderate and 89(38.5%) had mild anxiety.

![Fig 1(A): Pie chart showing percentage distribution of anxiety scores of preadolescents girls who attained menarche](image)

It also showed that out of 309 pre-adolescents who did not attain menarche, 35(11.3%) had severe anxiety, 192 (62.1%) had moderate and 82 (26.5%) had mild anxiety.

![Fig 1(B): Pie chart showing percentage distribution of anxiety scores of preadolescents who did not attain menarche](image)

**Coping pattern**

Out of 231 female pre-adolescents who attained menarche, 121 (52.4%) had adaptive coping pattern and 110 (47.6%) had mal adaptive coping pattern regarding pubertal changes. Out of 309 female pre-adolescents who did not attain menarche, 165 (53.4%) had adaptive coping pattern and 144 (46.6%) have mal adaptive coping pattern regarding pubertal changes.

**Correlation between Anxiety and Coping pattern**

Spearman Rho Correlation coefficient was computed between anxiety and coping pattern of pre-adolescents who attained and who did not attain menarche. It was evident that there was a significant relationship between...
anxiety and coping pattern of pre-adolescents in both the groups respectively (r = -0.754, p=0.001), (r = -0.675, p=0.001)

Table 2(A): Correlation Co-efficient computed between anxiety and coping pattern of female pre adolescents regarding pubertal changes who attained menarche. 

<table>
<thead>
<tr>
<th>Variables</th>
<th>r Value</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>-0.754</td>
<td>.001</td>
</tr>
<tr>
<td>Coping</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The data presented in table 2(A) shows that the correlation co-efficient of anxiety and coping pattern score of female pre adolescents who have attained menarche is (-0.754).

Table 2(B): Correlation Co-efficient computed between anxiety and coping pattern of female pre adolescents regarding pubertal changes who did not attain menarche  

<table>
<thead>
<tr>
<th>Variables</th>
<th>r Value</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>-0.675</td>
<td>.000</td>
</tr>
<tr>
<td>Coping</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The data presented in table 2(B) show that the correlation co-efficient of anxiety and coping pattern score of female pre adolescents who did not attain menarche is (-0.675).

Other findings of the study

Opinionnaire on informational pamphlet was collected and it showed that majority of the pre-adolescent girls (77.4%) believe to a great extent that information pamphlet on pubertal changes is a good source of learning. Most of the respondents (71.7%) strongly felt to a great extent that the pamphlet is easy to understand.

Discussion

The study revealed that majority of 121 (52.4%) the respondents who attained menarche had adaptive coping pattern and majority of the respondents 165(53.4%) who did not attain menarche also had adaptive coping pattern. Whereas, study by Vibha in Punjab revealed that male adolescents (92%) had more adaptive coping patterns than female (22%) adolescents.

The present study revealed that majority of 121 (52.4%) the respondents who attained menarche had adaptive coping pattern and majority of the respondents 165(53.4%) who did not attain menarche also had adaptive coping pattern. Whereas, study by Vibha in Punjab revealed that male adolescents (92%) had more adaptive coping patterns than female (22%) adolescents.

The findings of the present study show that there is a negative correlation between anxiety and coping pattern score of pre adolescents girls who have attained & not attained menarche (-0.754), (-0.675).

The findings were supported by similar study conducted by Bruce and Byrne. This study investigated the relationships between anxiety, fear, self-esteem, and coping strategies in a sample of 224 post primary students (years 7, 9, and 12) in Australia. There was a significant correlation (p < .01) between anxiety and fear for both the boys and the girls at year 7, r(34) = .49 and r(36) = .50, respectively, and at year 12, r(36) = .54 and r(38) = .52, there was none at year 9. Furthermore, for both the boys and the girls at year 12, there was a significant (p < .01) negative correlation between self-esteem and anxiety, r(32) = -.69 and r(32) = -.67, and between self-esteem and fear, r(31) = -.45 and r(31) = -.68. It is noteworthy that there was a stronger correlation between self-esteem and fear for the girls than for the boys at year 12.

The findings of the present study is supported by a correlational survey conducted by Jilu Meera to assess the knowledge and anxiety of pre-adolescents related to pubertal growth in Udupi district among 170 pre-adolescents. Majority 154 (90.58%) had moderate anxiety of which 83 were girls and 71 were boys. The data also showed that 16 (9.41%) had severe anxiety of which 8 were girls and 8 were boys.

The current study was limited to adolescents girls between 10-12 years of age studying in 5th, 6th and 7th grade in selected schools of Udupi Taluk.

Conclusion

The study concluded that majority of the respondents had moderate level of anxiety and adaptive coping pattern. The findings revealed a significant negative correlation between anxiety and coping pattern. Hence it is concluded that higher the anxiety score, lesser will be the coping pattern and lesser the anxiety higher will be the coping pattern. Most of the respondents felt that the informational pamphlet provided to them is the good source of learning and easy to understand.
Adolescents belong to a very vital age group as they are the entrant population to parenthood. These groups undergo vital physiological and psychosexual changes. So the preadolescents should receive adequate attention as a preparation to meet the changes in the adolescent period.

References
Knowledge, Attitude and Practice (KAP) Of Spread of HIV Infection through Needle Stick Injury among Dental Paramedics

Nidarsh Hegde¹, Freddy Kersi Mistry², Soumi Samuel³ & S.M. Sharma⁴

¹Professor, ²Post Graduate, ³Reader, ⁴Professor & HOD, Department of Oral & Maxillofacial Surgery, A.B. Shetty Memorial Institute of Dental Sciences, Nitte University, Mangalore, Karnataka, India.

Abstract

Aim: Study was conducted to know the knowledge of the paramedics working at Dental Institute, regarding spread of HIV infection through needle stick injury. Their current practice for the management of needle stick injury and their attitude for the same.

Materials and Method: 100 paramedical staff working in a Dental Institute were selected randomly to participate in the study. Each one of the participant were requested to fill a structured survey form prepared by the surveyor reflecting their knowledge, practice and attitude of spread of HIV infection through needle stick injury.

Results: The statistical analysis revealed the 92% of the paramedical staff knows what HIV infection is and that it can be spread through needle stick injury irrespective of their academic background. 42% of the paramedics have experienced needle stick injury, among which 95% have experienced 1-2 times a year. 61% of the needle stick injury have been reported by the paramedics with majority of them reporting to the head of the department followed by colleagues. According to the survey 95% of the paramedics followed the correct post injury protocol even though only 90% of them knew how to manage it correctly. 88% of the paramedics have been educated regarding the management of needle stick injury through the programme they have attended conducted by their respective institution.

Conclusion: This survey revealed that knowledge of paramedics about the risk association of spread of HIV infection with needle-stick injuries and use of preventive measures was adequate. A standing order procedure (SOP) which if formulated regarding needle-stick injuries should be further encouraged by the head of the respective departments especially to those who have newly joined the institution to obtain still better safety measures.

Keywords: Dental Paramedics, Human Immunodeficiency Virus (HIV), Needle Stick Injury (NIS).
Materials and Methods

Sample selection
A list of paramedical staff working at A. B. Shetty Memorial Institute of Dental Sciences, Mangalore from 2013-2014 was obtained from the institution office. A total of 100 paramedical staff were selected randomly who were doing different nature of work in different departments.

Methodology
A structured form of 14 questions was constructed by the surveyor and was distributed among the samples to know their knowledge, attitude and practice regarding the spread of HIV infection through needle stick injury.

The form was prepared in both the languages i.e. Universal language English and Local regional language i.e. Kanadda.

The samples were told to fill the form in front of the surveyor to prevent any influential bias.

Results

Demographic Characteristics of the paramedical staff working at institute

Table 1: Demographic Characteristics

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.) Sex</td>
<td></td>
</tr>
<tr>
<td>a.) Male</td>
<td>22</td>
</tr>
<tr>
<td>b.) Female</td>
<td>78</td>
</tr>
<tr>
<td>2.) Age</td>
<td></td>
</tr>
<tr>
<td>a.) 18-30</td>
<td>3</td>
</tr>
<tr>
<td>b.) 31-40</td>
<td>44</td>
</tr>
<tr>
<td>c.) 41-50</td>
<td>46</td>
</tr>
<tr>
<td>d.) 51-60</td>
<td>7</td>
</tr>
<tr>
<td>3.) Duration of their association to the institute</td>
<td></td>
</tr>
<tr>
<td>a.) 0-5</td>
<td>12</td>
</tr>
<tr>
<td>b.) 6-10</td>
<td>18</td>
</tr>
<tr>
<td>c.) 11-15</td>
<td>06</td>
</tr>
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<td>d.) 16-20</td>
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</tr>
<tr>
<td>e.) 21-25</td>
<td>34</td>
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<td>f.) 26-30</td>
<td>12</td>
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<tr>
<td>4.) Department</td>
<td></td>
</tr>
<tr>
<td>a.) Oral Medicine and Radiology</td>
<td>10</td>
</tr>
<tr>
<td>b.) Prosthodontics</td>
<td>20</td>
</tr>
<tr>
<td>c.) Conservative Dentistry and Endodontic</td>
<td>20</td>
</tr>
<tr>
<td>d.) Periodontics</td>
<td>10</td>
</tr>
<tr>
<td>e.) Orthodontics</td>
<td>10</td>
</tr>
<tr>
<td>f.) Pedodontics</td>
<td>10</td>
</tr>
<tr>
<td>g.) Oral and Maxillofacial Surgery</td>
<td>10</td>
</tr>
<tr>
<td>h.) Oral Pathology</td>
<td>05</td>
</tr>
<tr>
<td>i.) Preventive and Public Health Dentistry</td>
<td>05</td>
</tr>
</tbody>
</table>

Table 2: Level of knowledge and preventive measures taken by paramedical staff regarding needle stick injury

<table>
<thead>
<tr>
<th>Occupational Hazards and Preventive Measures</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.) Do you know what HIV infection is?</td>
<td></td>
</tr>
<tr>
<td>a.) Yes</td>
<td>92</td>
</tr>
<tr>
<td>b.) No</td>
<td>08</td>
</tr>
<tr>
<td>2.) Have you ever experienced Needle Stick Injury?</td>
<td></td>
</tr>
<tr>
<td>a.) Yes</td>
<td>42</td>
</tr>
<tr>
<td>b.) No</td>
<td>58</td>
</tr>
<tr>
<td>3.) What is the frequency of Needle Stick Injury per year?</td>
<td></td>
</tr>
<tr>
<td>a.) 1-2</td>
<td>40/42</td>
</tr>
<tr>
<td>b.) 3-4</td>
<td>02/42</td>
</tr>
<tr>
<td>c.) 5-6</td>
<td>00</td>
</tr>
<tr>
<td>4.) Have you reported the incident of Needle Stick Injury</td>
<td></td>
</tr>
<tr>
<td>a.) Yes</td>
<td>26/42</td>
</tr>
<tr>
<td>b.) No</td>
<td>16/42</td>
</tr>
<tr>
<td>5.) Do you know how to manage Needle Stick Injury?</td>
<td></td>
</tr>
<tr>
<td>a.) Yes</td>
<td>90</td>
</tr>
<tr>
<td>b.) No</td>
<td>10</td>
</tr>
</tbody>
</table>
92% of the paramedical staff knows what HIV infection is and that it can be spread through needle stick injury irrespective of their academic background. 42% of the paramedics have experienced needle stick injury, among which 95% have experienced 1-2 times a year. 61% of the needle stick injury have been reported by the paramedics with majority of them reporting to the head of the department followed by colleagues. According to the survey 95% of the paramedics followed the correct post injury protocol even though only 90% of them knew how to manage it correctly. 88% of the paramedics have been educated regarding the management of needle stick injury through the programme they have attended conducted by their respective institution.

Discussion

In this study out of 100 paramedics who participated 92% were aware that HIV infection can be transmitted through needle stick injury. A data combined from more than 20 prospective studies worldwide of health care workers exposed to HIV-infected blood through percutaneous injury revealed an average transmission rate of 0.3% per injury. One study reported that transmission occurred only from hollow-bore needles as compared with other sharp objects. Out of 42 paramedics experiencing needle stick injury, 61% of them have reported. Data from EPINet system suggest that at an average hospital, workers incur approximately 30 needle-stick injuries per 100 beds per year. It is believed that only one out of three needle-stick injuries are reported in the US, while these injuries virtually go undocumented in many developing countries.

The circumstances leading to needle-stick injury depend partly on the type and design of the device and certain work practices. In this study 84% of the paramedics wear double gloves when in contact with potential sharp objects, while in other studies they used double glove as precaution only in 23% of cases.

In 1985, in order to increase awareness among health care workers of the dangers of sharp injuries and other types of disease transmission, the Centre for Disease Control (CDC) and the Occupational Safety and Health Administration (OSHA) in the United States introduced the “Universal Precaution Guidelines”, which have been the worldwide standard in both hospital and community care settings. In our study we found that 90% of the participants knew how to manage needle stick injury, which is statistically high compared to various other studies.

Conclusion

This survey revealed that knowledge of paramedics about the risk association of spread of HIV infection with needle-stick injuries and use of preventive measures was adequate. A standing order procedure (SOP) which if formulated regarding needle-stick injuries should be further encouraged by the head of the respective departments especially to those who have newly joined the institution to obtain still better safety measures.

References

Awareness of Alcohol among Adolescents and Young Adults of Mangalore

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Abstract
Introduction: Alcohol consumption is a major public health problem in most parts of the world responsible for 3.2 per cent of deaths (1.8 million). Prevalence of alcohol use in India is reported to be 21.4%. The concern, is that there has been a rapid change in patterns and trends of alcohol use in India; chief among them is people beginning to drink at ever-younger ages. Alcohol consumption of the students under the age of 18 years is markedly high which needs to be addressed.

Aims and Objectives: To assess the awareness of risk factors in alcohol consumption among adolescents and young adults.

Materials and Method: Materials used are -Questionnaire pertaining to the awareness of alcohol consumption.

Methodology: Assessment of awareness and knowledge of alcohol consumption was done by means of answering a pretested validated questionnaire with anonymity.

Results: According to the study done, 67.18% of students knew who consumed alcohol under the age of 18. It was found, 28.03% of the subjects perceived that alcohol consumption started because of the urge to try something new.

Conclusion: A high majority of the students are aware of the underage drinking and risk factors associated with it.

Keywords: alcohol, awareness, adolescents

Introduction
Awareness of alcohol use and misuse on college campuses is not new. Alcohol consumption is a major public health problem in most parts of the world¹, responsible for 3.2 per cent of deaths (1.8 million). WHO has estimated that there are about 2 billion people worldwide who consume alcoholic beverages and 76.3 million with disorders arising out of harmful use of alcohol ². Prevalence of alcohol use in India is reported to be 21.4%. Alcohol consumption has been steadily increasing in developing countries like India and decreasing in developed countries since the 1980s.¹ Now-a-days there is increasing social acceptance of alcohol intake in various strata of society. The concern, say experts, is that there has been a rapid change in patterns and trends of alcohol use in India; chief among them being people beginning to drink at ever-younger ages.

Available research indicates that approximately 80% of college students drink and that half of student engage in heavy episodic drinking. Alcohol being high in calories can have ill effects on the body. Regular drinking over the permissible amounts can lead to serious health problems, from liver damage to an increased risk of cancer or heart attacks. Students who engage in excessive drinking impact not just themselves but also the people around them. Fellow students experience second hand consequences ranging from disrupted study and sleep to physical and sexual assault. To address these serious consequences of alcohol consumption by college students, the National Advisory Council to the National Institute on Alcohol Abuse and Alcoholism (NIAAA) established the Task Force on
College Drinking in 1998 With reference with that we tried to identify awareness level in students and their perception of risk factors.

Objectives
To assess the awareness of risk factors and among adolescents and young adults.

Material Methods
Community based cross-sectional study was conducted in different schools and colleges of Mangalore. Taking 20% awareness as baseline the sample size was calculated with 80% power of the study and 95% confidence interval, the sample size was calculated to be 400 with relative precision being 20% (power of study 80%). Considering 20% non response, we considered to interview 480 students. Universal sampling in the colleges which were randomly selected from the college list was done for students. Our total sample was 487. A questionnaire consisting of questions that were based on the perception, knowledge of alcohol consumption and its consequences was prepared. Reliability and face validity of the questionnaire was done and linguistic validation was done. The questionnaire was to be filled anonymously. Sufficient time was given to the students to complete the questionnaire. Only students willing to participate with consent given were included. The data obtained were compiled in Microsoft excel and the results were tabulated in proportions and cross tables.

Results
The socio demographic data was almost similar with no major differences in the cohort. According to the study done 67.14% of students were aware of who consume alcohol under the age of 18 years (fig no: 1). Among them 58.08% of the subjects knew where these people go to drink. 30.09% to bars, 24.50% to pubs, 20% to parties and the rest to liquor shop (table no: 1). We found out that 58.56% of people perceive that alcohol consumption was started to try something new. 31.87% due to peer pressure, 28.28% due to stress and 8.36% people were influence by movies (fig no: 2). Majority of the people perceived that alcohol consumption among these people was with their friends (79.02%) rather than consuming it alone (8.60%)

Discussion
Alcoholism is a broad term for problems with alcohol, and is generally used to mean compulsive and uncontrolled consumption of alcoholic beverages, usually to the detriment of the drinker’s health, personal relationships, and social standing. It is medically considered a disease, specifically an addictive illness. The World Health Organization (WHO) says there are at least 140 million alcoholics in the world; unfortunately, the majority of them are not treated. A US study estimated that about 30% of
Americans report having an alcohol disorder at some time in their lives.1

Based on our study we have observed that knowledge about alcohol consumption under 18 years of age was 67.14% and 31.82% had no idea about it.

We found that awareness about the availability of alcohol for students under 18 years was 50.77% in our study compared to the study conducted in Australia in 2004 where majority of the young people aged 12 – 17yrs i.e. 73% of them found it easy or very easy to get alcohol if they wanted some. Reported age of initiation of alcohol consumption has decreased over the last 5 decades. The age at which at least 50% of the survey responded, reported consuming a full serve of alcohol has reduced from approximately 19yrs to 15.5yrs in the Australian study5. In our study awareness was found to be good. Underage alcohol use remains a major public health and safety problem in India, creating serious personal, social, and economic consequences for adolescents, their families, communities, and the Nation as a whole. An emerging body of research on the effects of underage alcohol use on human maturation adds new urgency to the decade’s long effort by the public and private sectors to prevent and reduce underage drinking.

Limitations
Our study captures only few factors regarding awareness of alcohol consumption, hence it cannot explain all the reasons for a student to take up a habit of consuming alcohol. This study do not have representative sample from all colleges.

Conclusion
A high majority of the students are aware of underage drinking and probable reasons for that in which something to try new exceeds which needs to be considered in school counseling sessions.

References
A Descriptive Study on Knowledge of Registered Nurses Regarding Hospital Protocols on Biomedical Waste and Spillage Management and Needle Stick Injury in a Selected Hospital

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Abstract
Background: Infection control is a major component in health care practices. The health care team while providing services of curative, promotive or preventive, inevitably create waste and also cause injury which may be hazardous to health. Poor waste management practices pose a huge risk to the health of public, patients, professionals and also contribute to environmental degradation. Nurses as the part of health care personnel is expected to have proper knowledge, practice, and capacity to guide others for waste collection, management, and proper handling techniques.

Method: A descriptive study was conducted to assess the knowledge of nurses on biomedical waste management, spillage management and to determine needle stick injury among 210 registered nurses working in various wards of selected hospital. The convenient sampling technique was used to select the subjects. Baseline proforma and structured knowledge questionnaire was used to collect the data and data was analyzed using descriptive and inferential statistics.

Result: In this study it has been found that the majority of staff nurses (78.6%) had good level of knowledge, 18.1% had very good level of knowledge and 3.33% had satisfactory level of knowledge on Biomedical Waste and Spillage Management and Needle Stick Injury.

Conclusion: The findings of the study have shown that majority of staff nurses have good level of knowledge on Biomedical Waste and Spillage Management and Needle Stick Injury.

Keywords: Knowledge, staff nurses, descriptive approach, Bio-Medical Waste Management (BMW), spillage management, management of needle stick injury.

Introduction
All activities of living things on earth produce waste in some form or the other. Normally, aerobic and anaerobic process in the environment degrade such products. Hospitals and medical health centers are places to diffuse disease. Infectious situations at hospitals should be a primary concern. Hospital waste cause many things to be at risk and lost, including human life, environmental health and funds. Therefore improper handling of solid waste in the hospital may increase the air borne pathogenic bacteria, which could adversely affect the hospital environment and community at large.

Waste generated from medical activities represents a real problem of living nature and human world. Improper management of waste generated in health care facilities causes a direct health impact on the community. In a hospital, management of spillage of hazardous substances such as bodily fluids, drugs, cleaning fluids and other chemicals are very essential. It is essential, therefore, the hospital should have the right equipment and well trained staff on hand to deal with any spills immediately when they arise.
stick injuries are a hazard for people who work in health care set up and these injuries can occur at any time when people use, disassemble or dispose of needles and can become a potential source of infection.

Through the 1990s, between 6 lakh and 8 lakh needle stick injuries were believed to occur annually – on the order of 2,000 every day. As a result, more than 1,000 health care workers contracted serious blood borne diseases.

In this aspect, the knowledge of nurses is important to prevent the spread of pathogens and microorganism and also serious health consequences. Nurses are a part of health care team who are constantly coming in contact with biomedical waste, spillage and needle stick injuries. They can develop, implement, and evaluate a plan to reduce needle stick injuries in the institution, and evaluate needle devices with safety features. Hence it is important to know the knowledge of nurses in biomedical waste management, spillage and needle stick injury management.

Materials and Methods
The study was conducted after obtaining the ethical clearance and permission from the Chief Nursing Officer among registered staff nurses who have the clinical experience for more than a month in all the wards such as Intensive Care Units, Dialysis unit, Post operative, Medical, Surgical, Orthopaedic, Paediatric, Oncology, Obstetrical and Gynecological, Psychiatric wards and De-addiction centre of Father Muller Medical College Hospital, Mangalore. Nursing Supervisors, Ward in-charges, Night duty staffs were excluded from the study. Baseline variables and structured knowledge questionnaire used to assess the knowledge regarding hospital protocols on bio-medical waste management, needle stick injury and spillage.

Results
Descriptive and inferential statistics will be used for the data analysis.
Knowledge of staff nurses on biomedical waste management, spillage management and needle stick injury

<table>
<thead>
<tr>
<th>PERCENTAGE</th>
<th>SATISFACTORY</th>
<th>GOOD</th>
<th>VERY GOOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOMEDICAL WASTE MANAGEMENT</td>
<td>3.80%</td>
<td>52.40%</td>
<td>43.80%</td>
</tr>
</tbody>
</table>

Fig. 1: Bar diagram showing the distribution of staff nurses based on the knowledge on biomedical waste management

<table>
<thead>
<tr>
<th>PERCENTAGE</th>
<th>SPILLAGE MANAGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPILLAGE MANAGEMENT</td>
<td>1%</td>
</tr>
</tbody>
</table>

Figure 2: Bar diagram showing the distribution of staff nurses based on the knowledge regarding spillage management.

<table>
<thead>
<tr>
<th>PERCENTAGE</th>
<th>POOR</th>
<th>SATISFACTORY</th>
<th>GOOD</th>
<th>VERY GOOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEEDLE STICK INJURY</td>
<td>0%</td>
<td>5%</td>
<td>15%</td>
<td>15%</td>
</tr>
</tbody>
</table>

Figure 3: Bar diagram showing the distribution of staff nurses based on the knowledge regarding needle stick injury.

Discussion
The present study shows that the majority of the subjects are female (95%) and most of the subjects were completed graduation B.Sc. (59.52%) 63.80% had six months to two years of clinical experience. The study shows that 90.95% are attended educational programme, in that 80.48% attended before one to two years. The result of the present study reveals that mean percentage of the knowledge of registered staff nurses regarding hospital protocols on bio-medical waste management, needle stick injury and spillage is (78.6%) which in turn shows that they have good level of knowledge on bio-medical waste management, needle stick injury and spillage. Comparing the study done earlier in Mangalore on the knowledge and practices of health care providers on bio-medical waste management, most of the interviewers were aware of the measures for safe collection, segregation and disposal of BMW. Highest percentage regarding knowledge on BMW management was seen among the nurses (61.3%) followed by doctors (46.6%), non-teaching staffs (37.7%) and lab technicians (27.9%).

Conclusion
India generates around three million tones of medical wastes every year and the amount is expected to grow at eight per cent annually. Biomedical waste management, needle stick injury and management of spillage are part of infection control and it is generated from the biological and medical sources and activities, such as the diagnosis, prevention or treatment of diseases. Common producers of biomedical waste include hospitals, health clinics, nursing homes, medical research laboratories etc. Nurses as part of health team plays a key role in managing the biomedical waste management.

References
Introduction
Chest deformities have an incidence of 1:1000 live births[^1] and pectus deformities are among the commonest of anterior chest wall deformities. With the introduction of minimal invasive corrective procedures for pectus deformities, increasing number of children are actively participating in cosmetic corrections[^2]. Many authors have done extensive work on radio-diagnosis of pectus deformities and have given many internationally accepted radiological indices for evaluating and categorizing chest wall. Among those indices, Haller's index (HI), classical vertebral index (VI), configuration index (CI), cardiac deformity index has proven to be beneficial for objective evaluation of pectus deformities and also in quantitative assessment of internal thoracic volume[^3-6].

Prevalence and etiology of chest wall deformities, among the Indian population still remain unexplained and only scanty literature was retrieved on extensive search from the journal web[^7], probably pointing towards the lack of objective documentation about the deformity. Pectus deformities in India have failed to attract much needed medical attention, because majority of cases are asymptomatic, needing no medical or surgical intervention and hesitancy for the cosmetic corrections due to cultural and religious hindrances.

With a wide spectrum of pectus deformities seen, an attempt has been made to bring forth a new radiological index for the overall quantitative assessment of the chest wall during pectus deformities.

New Radiological Index for Evaluation of Pectus Deformities in Indian Population

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Abstract
Aim : To evaluate the effectiveness of new radiological index for the diagnosis of pectus deformities in Indian population using computed tomography (CT) imaging.

Materials and methods : 60 subjects with mild to moderate pectus deformities and 100 controls with age group from 1 to 40 years were evaluated for the study. Non contrast CT images with sagittal, axial sections and 3D reconstructed images were utilized for the measurement of manubriosternal joint (MSJT) angulation as well as sterno-vertebral (SV) distance and transverse diameter (A) of chest.

Results : In controls manubriosternal joint showed mean value of 166.6±5.27, in pectus carinatum (PC) MSJT measured about 170±5.2 and in pectus excavatum (PE) MSJT had a value of 157.6±14.57 and internal thoracic dimensions like sterno-vertebral distance measured about mean of 91.3±18.12 in controls, 80.24±14.57 in PE and 99.13±15.6 in PC and transverse diameter with a mean of 208.72±33.9 in controls, 223.14±28.92 in PE and 192.2±40.96 in PC.

Conclusion : Inclusion of MSJT angulation as radiological index alongside of internationally accepted indices like sterno-vertebral distance and transverse diameter of chest would ensure comprehensive assessment of chest wall deformation and help in better understanding of sternal displacement during pectus deformities.

Keywords : manubriosternal joint; pectus excavatum; pectus carinatum; sterno-vertebral distance
The aim of the study was: a) to understand the alteration of manubriosternal joint angulation in pectus deformities, using CT images of the thorax and b) to study the influence manubriosternal joint angulation on sterno-vertebral distance and transverse diameter of the chest.

Materials and methods
100 control subjects with an age group ranging from 1-40 years with a median of 21, and 60 cases of mild to moderate pectus deformities with age ranging from 1-40 years with a median age of 18 were evaluated and included in the study. Informed consent was taken from patients' representatives and methodology was followed in accordance with the ethical standards of NITTE University and KVG medical college and hospital.

Radiological indices measured are as follows
Computed tomography images were utilized to enhance the precision in the measurements. Non-contrast CT images of the thorax, with sagittal and axial sections have been utilized for the measurement of the indices.

First, evaluating manubriosternal joint position (MSJT): A point on the posterior end of the manubrium near its upper borber, another at the posterior end of manubriosternal joint and a third point along the posterior border of body of sternum at the level of the fourth costal notch. The posterior end of manubriosternal joint position (angulation) was determined by drawing lines to join the points marked on the plain sagittal section of CT image [fig 1].

Secondly in the sagittal section of thorax, sterno-vertebral (SV) distance was measured by a line joining the posterior end of xiphisternal joint to the anterior part of the body of the corresponding vertebrae [fig 1] and finally in the axial section of thorax at the level of xiphisternal joint, transverse diameter (A) of chest was measured by the distance between the point of maximum concavity on the inner surface right rib to the point of maximum concavity on the inner surface of left rib at same level [fig 2].

Inclusion criteria for controls
a) Absence of depression or protrusion of the central portion of anterior chest wall during physical examination
b) Age group ranging from 1-40.
c) CT scanning was performed as another type of clinical investigation

Subjects excluded were those with any affection that might interfere in the normal morphology of the thoracic cage like:
a) Early stage of vitamin D deficiency
b) Early stages of bone carcinoma of sternum or ribs

Inclusion criteria for cases were
a) Presence of depression or protrusion of anterior chest wall on physical examination
b) Age group of 1-40 years

Subjects excluded were:
1. Sternal fractures
2. Surgically corrected chest wall
3. Tilted sternum
4. Chest deformity due to underlying lung or pleural pathology and mediastinal masses
5. Asymmetrical pectus deformity and combined pectus deformity

Statistical analysis
The value has been depicted as Mean±SD. Mean values are compared by the method of two independent samples and significance was calculated using 'Z' test as the sample size was large and unequal. Critical range of 0.05 was set in accordance with the 5% error probability. Box-whisker’s plot has been used to depict the range of MSJT angulation in controls and in pectus deformities. Pearson's rank correction test has been used to find the correlation between the manubrio-sternal joint and internal thoracic dimensions. Data was analysed using SSPS and excel software.

Results
Table 1 represents the mean±SD values of manubriosternal joint angulation and internal thoracic dimensions measured in controls and in pectus deformities. In controls, the age group was ranging from 1-40 years with median of 21 years, showed MSJT angulation
of 166.6±6.27° with a range varying from 154 to 178°. Internal thoracic dimensions like sterno-vertebral distance showed a mean of 91.3±18.12, with a range of 48 to 141mm and transverse diameter showed a mean of 208.72±33.9, with a range of 90 to 264mm. In deformities like pectus excavatum, the MSJT measured around 157.6±8, with a range of 134 to 170 and the sterno-vertebral distance having a mean of 80.24±14.57, with range varying from 44 to 96mm and also the transverse diameter showing a mean of 223.14±28.92, with range varying from 136 to 260mm. Lastly in pectus carinatum, MSJT had a mean of 169±5.05, with a range varying from 152 to 174, sterno-vertebral distance with a mean of 99.74±15.22 and a range of 57.8 to 122.7mm and lastly the transverse diameter of chest showed a mean of 196.2±36.96, with a range of 101 to 262mm.

Change in the MSJT angulation and internal thoracic dimensions in pectus excavatum were highly significant in comparison with controls at a confidence of 99% and there was an evident change in MSJT angulation and internal thoracic dimensions even in pectus carinatum but were statistically insignificant. Relationship between MSJT and sterno-vertebral distance showed a positive correlation and correlation between MSJT and transverse diameter showed a negative correlation.
Table 1: Manubriosternal angulation and internal thoracic dimensions in controls and pectus deformities

<table>
<thead>
<tr>
<th>No:</th>
<th>MSJT (°)</th>
<th>SV(mm)</th>
<th>A(mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controls 100</td>
<td>166.6±6.27</td>
<td>91.3±18.12</td>
<td>208.7±33.9</td>
</tr>
<tr>
<td>Pectus excavatum 28</td>
<td>157.6±9.7**</td>
<td>80.24±14.57*</td>
<td>223.14±28.92*</td>
</tr>
<tr>
<td>Pectus carinatum 32</td>
<td>169.0±5.05*</td>
<td>99.74±15.22*</td>
<td>196.2±36.96</td>
</tr>
</tbody>
</table>

** Indicates significant at p<0.01 using 'z' test of unequal samples
* Indicates significant at p<0.05 using 'z' test of unequal samples

Discussion

Present study was an initial step towards better understanding of the pectus deformity in the Indian population. Growing awareness about the advances in diagnostics and specialised cosmetic surgeries for the correction of chest deformities has made the current study "need of the hour"; if we could say so. The physiological consequences of pectus deformities of the chest wall are not generally important but the cosmetic and psychological significance has been largely ignored in the past. Present changes in cultural trends have significantly altered perception and tolerance of pectus deformities increasing the number of children who are actively seeking surgery. Pectus excavatum is readily amenable to correction using minimally invasive techniques. Good or excellent results can be expected in over 90% of cases and children should no longer be denied treatment. The optimal age for surgery is probably when the patient feels that correction is necessary [2].

Chest deformities are among those skeletal deformities which are easily identifiable by external physical examination, but conclusive diagnosis just by physical examination may present certain limitations and can be misleading, for instance, mild variations in the configuration of costal cartilages, ribs and sternum are commonly encountered in children is a normal [6] or type 2 pectus carinatum would give a false appearance of pectus excavatum [5] on examination. Therefore, CT and MRI are not to be considered as adjunct diagnostic procedures, but as primary diagnostic tools, it would not just to facilitate comprehensive understanding of the deformity, but also to objectively categorize the deformity as mild, moderate or severe based on various indices.

Precise radiological assessment parameters delineating the limits of norm and pathology in chest deformities have not been well defined. There are many internationally accepted radiological indices, which have been used as a pre-operative objective measurement for chest deformities. Yet every index presents its own limitations and drawbacks. For example Classical vertebral index and Haller index provide information of one level of the chest and not of other levels which possibly also may be abnormal. The Configuration Index (CI) which is the ratio of upper vs lower chest diameter, becomes larger in pectus excavatum (especially when associated with scoliosis) and to a lesser extent also in pectus deformatum, while it became smaller in pectus carinatum. The CI was especially valuable in complex chest deformities (often with axial sternal rotations) and in pectus excavatum with scoliosis where it was more often significantly changed, but does not explain more about the deformation of ribs.

With every radiological index presents its own limitations and drawbacks, precise radiological assessment parameters delineating the limits of normal and pathological have not yet been defined. Therefore, for the overall and comprehensive assessment of pectus deformities, for the first time manubriosternal joint angulation has been taken into consideration for analysing the pectus deformities. In the development of pectus deformity sternal displacement is among the key structural alteration. Many authors are under the impression that the displacement of sternum occurs first, followed by changes in costal cartilages which has no option but to follow the sternum in its displaced position. Displacement of sternum usually begins at the junction of manubrio-sternal joint [12].

With the evidences explaining the involvement of manubriosternal joint in pectus deformities. The study was carried out by measuring the manubriosternal angulation in controls and cases [fig 3] and its influence on alteration of mediastinal space has been assessed by evaluating sterno-vertebral distance and transverse diameter of the chest.

Manubriosternal joint measured an average of around 166°
in normal individuals, which increased to a statistically insignificant angulation of around 170° in subjects with pectus carinatum, and decreased to a significant level of 156° in pectus excavatum.

Cardio-respiratory dysfunction, easy fatigability and frequent respiratory infections are some of the common signs and symptoms seen in pectus deformities, which are mainly attributed to reduced intra thoracic volume and mediastinal space. Intra-thoacic space is a product of sterno-vertebral distance (antero-posterior dimension) and inter rib distance (transverse diameter of the chest). Therefore, we have measured the sterno-vertebral distance (SV) and transverse diameter of the chest (a) in normal so as to compare it with pectus deformities.

If 91.3mm was the average sterno-vertebral distance in normal, this distance increased to an average of 99.13 in pectus carinatum, it reduced to a statistically significant average of 80.24mm in excavatum. Therefore sterno-vertebral distance directly proportional to manubriosternal angulation, that is, any increase in angulation also increases sterno-vertebral distance and vice versa.

Manubriosternal angulation has direct influence on the sterno-vertebral distance. Every 1° change in manubriosternal angulation, the sterno-vertebral distance was altered by 1.8mm. Change in angulation means alteration in the position of the body of sternum (gladiolus) in relation to manubrium. In conditions like pectus excavatum, the gladiolus moved closer to vertebral column and the angulation became acute at the manubrio-sternal junction in turn reducing the sterno-vertebral distance and as the angulation becomes more obtuse, as in pectus carinatum, the gladiolus moves away from the vertebra thereby increasing the sterno-vertebral distance [fig 4].

Similarly, the next internal thoracic dimension measured was the transverse diameter of the chest; we noted that as the distance between sternum and vertebra altered with aging or in pectus deformities, the transverse diameter of the chest also showed changes. The transverse diameter in controls showed a mean of 207.20mm, which reduced to a significant level in pectus carinatum to 189.22mm and increased to a significant level in pectus excavatum to 220.26 (p<0.003). Study by klida et al., (2009) showed the preoperative sternovertebral distance in pectus excavatum was 79.81±6.96mm, which increased to 97.84±17.08mm during the first month after operation, 110.55±13.85mm after sixth months postoperatively and the transverse diameter of chest measured a mean 273.0mm preoperative, which reduced to 259.7mm during the first month post-operative [11]. These alterations in the inter rib distance may be a compensatory deformation to accommodate thoracic organs Therefore the transverse diameter of the chest was inversely proportional to MSJT.

Conclusion
To completely understand the alterations of the internal thoracic dimensions in pectus deformities, Inclusion of MSJT angulation as an radiological index alongside of internationally accepted indices like sterno-vertebral distance and transverse diameter of the chest would ensure comprehensive assessment of chest wall deformation and help in better understanding of sternal displacement during pectus deformities.

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**Optional Vaccines for Better Immunization: Awareness among Mothers**

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**Abstract**

Effectiveness of structured teaching programme on knowledge of optional vaccines among mothers of under five children in selected rural areas. The Sample include 30 mothers of under five children. Research approach was quantitative - evaluative approach and design used was quasi experimental pretestposttest design. In the first phase, researcher assessed pretest knowledge and health teaching was given to selected mothers with the duration of 45 minutes. The posttest knowledge was assessed over a period of 7 days after the intervention. The community participation has found to be effective with a Paired t value (P<0.001) shows significance which indicates community participation was effective in terms of knowledge gain.

**Keywords**: optional vaccines, knowledge

**Introduction**

WHO estimates that in 2007 the under five mortality was 78.8 deaths /1000 live births. In that, most of the deaths are attributed to vaccine preventable diseases like tuberculosis, typhoid; pneumonia, polio, diarrheal diseases, and tetanus etc. Many of the mothers are unaware about the number of doses of each vaccine and also about the time limit for the particular vaccine that should be administered to the child.

Immunization describes the whole process of delivery of a vaccine and the immunity it generates in an individual and population. A vaccine is a special form of a disease-causing agent (e.g., virus or bacteria) that has been developed to protect against that disease. Immunization forms one of the most important and cost effective strategies for the prevention of childhood sicknesses and disabilities and is thus a basic need for all children. The last 20 years have seen an explosion in the number of new vaccines. Many other vaccines are available against many other diseases like typhoid fever, chicken pox, pneumonia, meningitis etc.

National Immunization services now offers protection against an additional diseases in some specific areas. Hepatitis B Vaccine protects against serious disease of the liver. Homophiles influenza type b or Human Influenza B Vaccines (HIB) is another vaccine which protects against pneumonia, meningitis. Regarding Meningitis 2005 about 8357 cases were reported in India with 485 death. WHO (2007) each year in the world about 145 million children are born around 2.4 million deaths among children under five are still due to vaccine preventable diseases and infections in early life. Mortality rate may be greater in developing countries, because of low resistance of these children against infection. In the developing world some 23% of deaths among children under five years occur in the first month. However about 3 million babies in the developing countries die during early childhood. In recent years however relatively low immunization levels in this age group have occasional scattered out break of certain disease. For this reason in spite of the national effort some immunizations are administered optionally to improve the immunization levels of all children. This vaccination helps...
to making the babies' immune system stronger.

Immunization is the most effective tool which greatly prevent and reduce incidence and severity of common seven diseases include of whooping cough, diphtheria, tetanus, hepatitis, tuberculosis, poliomyelitis, measles, which a together responsible as leading cause of all death in children under the age five. During the survey the researcher had the opportunity to interact with the parents .It was found that the parents of the under five children were unaware of giving vaccines and its importance in the health of their child. In the light of the above facts, it is an essential fact that mothers of under five should bring up their knowledge about the optional vaccines in order to bring up a new generation with less risk. Hence the investigator was interested to assess the knowledge of mothers regarding optional vaccines.

Materials and Methods:

Study Hypothesis

H1: Knowledge level of mothers will not be increased after structured teaching programme on optional vaccines.

H2: There will be no significant association between knowledge score of mothers regarding optional vaccines and selected demographic variables.

Study design and Study population

This quantitative study adopted an evaluative approach to identify the effectiveness of structured teaching programme on knowledge regarding optional vaccines and the design used was quasi experimental pretest-post test group design. The study population was mothers of under five children who resides in (Dharagudele and Makki) Moodbidri

The sample size was 30 mothers of under five children. Administrative permissions was obtained from concerned authorities. The mothers were informed of the purpose of the study and the content was taken from them. Confidentiality was maintained during data collection. Ethical clearance was obtained from the institutional ethics committee, Alva's hospital, Moodbidri

Data collection instruments and measurements

The following tools were used to collect the data

**Tool 1: Background Performa**

It consists ten items for obtaining information’s regarding Age, Type of family, Educational status, occupation, religion, Source of information, Family income Distance from immunization center. The tool was validated by eight experts, pretested among five mothers residing in a village.

**Tool 2 : Structured knowledge questionnaire on knowledge on optional vaccines**

The questionnaire dealt with Introduction about immunization, types of vaccine, National immunization schedule and optional vaccines. It had a total of 28 items divided into two sections, section A and B with 8 and 20 items in each section respectively. The items in the section A had 4-5 alternate responses and the items in the section B had 4 responses. The respondents were requested to select the best possible option by encircling the correct answer. The minimum score was 1 and maximum score was 20. Knowledge score was arbitrarily classified as inadequate Inadequate Knowledge (0 – 10), Moderately Knowledge (11-15) Adequate Knowledge (16- 20). The tool was validated by eight experts, translated in Kannada and pretested among five mothers residing in a village.

Pilot study was conducted among 10 sample and changes were made in the tool accordingly.

Procedure

The study was carried out. Tool 1 and 2 was administered among the selected participants. Firstly pretest was conducted, the health teaching by the researcher was given to selected mothers. The post- test knowledge was assessed over a period of 7-9 days after the intervention.

Statistical analysis

The data were analyzed using both Descriptive and inferential using Statistical package for Social Science version 16 (SPSS 16).

Descriptive statistics: Frequency and percentage distribution, mean and standard deviation were used to
describe the sample characteristics.

Inferential statistics: Mann Whitney U test and paired t test was used to test the effectiveness of intervention between and within the group respectively.

Results

In 30 samples 11(36.6%) mothers belongs to age group of 31 and above, 9(30%) mothers belongs to age group of 27-30, 5(16.66%) mothers belongs to age group of 19-22 and 23-26. (Type of family) 15(50%) belongs to nuclear family, 15(50%) mothers belongs to joint family. (Education) 12(40%) have primary education, 9(30%) have secondary education and 9(30%) have higher secondary. 13(43.3%) are very near to the immunization center, 13(43.3%) reach in half an hour, 4(13.3%) reach in one hour. (occupational status) 15(50%) mothers are house wife, 11(36.6%) mothers are coolie, 3(10%) mothers are self-employed , 1(3.3%) mothers is private employee.( source of information) 15(50%) mothers are health personals, 8(26.6%) have no information, 3(10%) mothers got information from electronic media ,2(6.6%) mothers interacted with friends/neighbors, 2(6.6%) mothers got information from relatives/family members. religion 17(56.6%) of the mother are Hindu, 11(36.6%) of the mother are Muslims, 2(6.6%) of the mothers are Christians. 10(33.3%) have family income 2001-4000 per month, 9(30%) have income less than or equal to 2000, 8(26.6%) have 4001-6000, 3(10%) have 6000 and above.

The study reveals that there is significant association between pre-test knowledge score and demographic variable like child’s Type of family (Chi-square = 7.846, df – 1,p = 0.005),but there was no significant association between the pre-test knowledge and any other demographic variables like income of family, source of information and distance between home and immunization center..

Effectiveness of structured teaching programme in terms of gain knowledge

In the study the mean post-test knowledge score (16.73) was higher than pre-test knowledge scores (6.46). The mean difference between pre-test and post-test score (10.27) of knowledge is significant at 0.001 level, as ’t’ = 15.87 (P <0.001).

Hence the research hypothesis H1 was accepted. The difference of means observed is a true difference. Hence it can be concluded that Structured Teaching Programme has an influence in improving the knowledge of mothers on Optional vaccines.

Discussion

In the present study knowledge of mother was assessed regarding optional vaccines, during the pre-test knowledge scores of mothers on optional vaccines 25(83.3) percent) mothers had Inadequate knowledge and 4(13.3 percent) had moderately adequate knowledge and 1(3.3%) had Adequate knowledge. During the post-test knowledge scores of mothers on optional vaccines 14(46.6 percent) mothers had adequate knowledge and 16(53.3 percent) had moderately adequate knowledge. For the success of
any programme, it is important to create public awareness and have wholehearted participation of the people and healthcare personal. In spite of many educational programs targeting the vulnerable group of population, mother and child the health scenario of our country is far below from satisfactory. 9.7 million children are dying worldwide before five years of age which include 21% from India. Of this 19% is due to pneumonia, 17% is due to diarrhea, malaria 8%.and measles 4%. In India 9.4 million children are not immunized.

Conclusion
This study findings revealed that structured teaching programme was successful in improving the knowledge of mothers so that they can practice optional vaccinations of their children in time which will be helpful in reducing the incidence of childhood mortality and morbidity rate.

Implications
The nursing curriculum should consist of knowledge related to vaccine preventable diseases, immunization schedule and information regarding optional vaccines using different methods of teaching. Nursing students should be taught to consider health education as a way of life and practice it in their day to day activities. The nurse administrator should create awareness among mothers in order to prevent diseases and to improve their knowledge on delayed and optional vaccines by posters, charts etc. This study helps the nurse researcher to develop insight into the new and current teaching modules and materials for educating the mothers on optional vaccines. Studies can be done including knowledge, attitude and practice on immunization among mothers.

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Effect of Ionising Radiation on Micro Hardness Property of Restorative Materials

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Abstract

Patients receiving radiation therapy as source of treatment are commonly known to have restorations on their tooth composed of resin or non-resin restorative materials. Any interaction between ionising radiations and these restorative materials can have adverse effects which can be of clinical significance. Hence in this study we investigated the effects of ionising radiation on 3 restorative materials (Impress Direct, Glass Ionomer Gold Label Type 9 and Te- Econom Plus) by testing their microhardness property. All the 3 composite materials showed increased mean micro hardness values among the radiated groups and was found to be statistically significant (P<0.05). The results obtained indicated that restorative materials has undergone increased degree of polymerisation strengthening the bonds sustaining its stability. Hence the above effect will have no adverse effects on the human health, hence these materials are suitable for endodontic treatment among patients undergoing radiotherapy for head and neck cancer.

Keywords: Ionising radiation, Composites, Restorative materials, microhardness test

Introduction

Head and neck carcinomas are being reported in high numbers all over the globe. The treatment module includes radiation therapy that involves ionising radiation as primary source or as a supplementary regimen [1]. The patients undergoing radiotherapy are usually known to have restored teeth with dental materials. Hence, any interaction between these restorative materials and incident ionising radiation might result in adverse effects. Thus this combined effect may serve as a matter of public health concern if the mechanical properties of these materials are affected. Surface microhardness is one among those properties which is being used to check the resistance against wearing of these materials. This property is an indication of the stability of Restorative materials under various forces applied during mastication process. Since hardness of the material is equivalent to its limits and strength, their physical performance are better distinguished under stress [2-5].

Composites are the mainly used materials in restorative dentistry. Nowadays Glass Ionomer and other Nano-hybrid composites are also used for this purpose. This advancement in the technology has made restorative materials highly durable with increased strength reducing the abrasion [6-10]. The abraded surface leads to plaque deposition and are more prone to post-radiation caries around the restorations.

Dental composite are types of synthetic resins enormously used in dentistry as restorative material or adhesives. They are used in the restorations of anterior and posterior teeth, as sealants for pits, for cementation. Composite materials are composed of 3 main components: fillers, matrix and coupling agents. Matrix is a phase that polymerises to form a solid thereby binding to the tooth structure. It is the
weakest and the wear resistant phase. Composites are often classified by filler size. Fillers determine the surface smoothness where larger filler particles produce rough surface. As the filler content increases resin matrix decreases and thus increases the hardness and abrasion resistance of the composite. Coupling agent is a compound that binds matrix and fillers. It improves the physical and mechanical properties of the whole composite material. It also inhibits leaching by preventing water from penetrating along the resin filler interface [11].

The newer generation of composites are Nanohybrid composites. These have high durability and maintain natural gloss and shine in the restorations for many years. Nanohybrid composites are highly recommended restorative materials in the recent days and the most popular among them is IPS Impress Direct [22]. The unique properties of these composites are attributed by the addition of nanoparticles to the hybrid mixture which has increased its wear resistance and surface finish. They offer numerous advantages to the clinicians as well as to the patients such as wide color range suitable for tooth restoration, glossy finish, durability, high adhesiveness and also requires minimal removal of tooth [23].

Glass Ionomer Cements (GIC) are the unique restorative materials widely used in dentistry. They are chemically bonded to Enamel and Dentine providing caries protective fluoride release at the border line of restorations. The most distinctive properties of GIC is moisture resistance, which has made it accessible in clinical applications. These cements are known to undergo self-setting acid base reaction created by mixing an ion-leachable (fluoride ion) fluoroaluminosilicate glass (powder) with an aqueous polyacrylic acid or polycarboxylate acid (liquid). The higher viscosity of the compounds have resulted in improvements in tensile strength, compressive strength, fracture toughness, greater wear resistance and higher fluoride release [24].

Literature on the properties of restorative materials effected by non-ionizing radiation is available [12, 13]. But very limited studies have been carried out to study the effects of ionising radiation on surface and bulk properties of these materials. Hence this study is focused on investigating the effect of ionising radiation on mechanical strength of restorative materials by determining their surface microhardness.

Radiation dosage of 70 Gy is been used in the present study based on the treatment regimen for Head and Neck Cancer patients which depends on the tumor size [26]. For early stages it varies from 66- 74 Gy (2.0 Gy/ fraction; daily in 7 week). In cases of post-operative radiation treatment, the doses range from 60-66 Gy (2.0 Gy/ fraction, < 6 weeks) [25]. The purpose of this study was to analyse the changes occurring in restorative materials by testing its mechanical strength after radiation treatment. This result will be useful for clinicians to sustain or remove these restorative materials during the radiation treatment period from the endodontically treated tooth.

**Materials and Methods**

The Three materials used in this study are Te-Econom Plus (Ivoclar Vivadent, Bendererstr, Schaan, Liechtenstein) Impress Direct (Ivoclar Vivadent, Bendererstr, Schaan, Liechtenstein) and Glass Ionomer Type 9 (GC Asia Dental Pte Ltd, Loyang Way, Singapore). The product details are given in the Table 1.

<table>
<thead>
<tr>
<th>Brand</th>
<th>Manufacturer</th>
<th>Type</th>
<th>Composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Te-Econom Plus</td>
<td>Ivoclar Vivadent Schaan, Liechtenstein</td>
<td>Radiopaque Hybrid</td>
<td>ytterbium trifluoride, Bis-GMA, urethane dimethacrylate, triethylene glycol dimethacrylate</td>
</tr>
<tr>
<td>Impress Direct</td>
<td>Ivoclar Vivadent Schaan, Liechtenstein</td>
<td>Nano Hybrid</td>
<td>Ba-Al-fluorosilicate glass, Dimethacrylate, Ytterbium trifluoride, Pre polymer, Silicon Dioxide, Barium glass Filler: 0.4-0.7</td>
</tr>
<tr>
<td>Glass Ionomer Cement, Gold label, Type 9</td>
<td>GC Asia Dental Pte Ltd, GC Corporation, Loyang Way, #06-27 Singapore</td>
<td>Non resin based, Type 9, radiopaque, Posterior Restorative</td>
<td>Powder- Fluoro-alumino silicate glass Polyacrylic acid powder Liquid - Distilled water Polyacrylic acid</td>
</tr>
</tbody>
</table>

Table 1 : Description of investigated restorative materials
12 specimens of each material were prepared using Teflon mold of 2mm depth and 6mm diameter. The specimens were grouped into 2 categories: non-radiated and radiated (6 samples each). The composites were light-cured using Heliolux light curing unit (Vivadent, Amherst, NY, USA). The samples were stored in artificial saliva at 37°C to stimulate the oral environment. 6 specimens of each material were irradiated with Cumulative radiation dosage of 70 Gy (2gy/fraction for 35 days) using Electron beam Irradiator in Microtron Center, Mangalore University.

The irradiated and non-irradiated samples were then subjected to hardness testing using a Micromet microhardness tester (Matzusawa Co Ltd, Model MMT XA, Tohshima, Japan). On each sample surface, three indentations were made using a 300 gf load for 15 seconds (Fig 1-2). The average of these 3 indentations were considered and the strength is determined by Vickers Hardness Number (VHN) value. The difference in mean microhardness values of radiated and non-radiated groups were analysed by performing Independent t-test at 5% level of significance. Further Pairwise Comparison by Bonferroni adjustment was determined to find mean differences between the restorative materials.

The mean microhardness (VHN) values of 3 restorative materials of radiated and non-radiated groups are given in the Table 2 and represented in Fig 3. All the three materials show an increase in microhardness number after radiation. The difference between the radiated and non-radiated groups as evaluated by Independent t-test was found to be statistically significant at the p value <0.001. The highest mean difference of 22.92 was obtained with Impress Direct material, followed by GIC Gold label, type 9 (19.39) and Te-Econom Plus (12.34) respectively (Table 2).

### Table 2: Mean Microhardness values of Restorative materials (radiated and non-radiated groups)

<table>
<thead>
<tr>
<th>Materials</th>
<th>Radiated/ non radiated</th>
<th>N</th>
<th>Mean microhardness Value</th>
<th>Std. Deviation</th>
<th>Mean difference</th>
<th>95% Confidence Interval of the Difference</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Te- Econom Plus</td>
<td>non-radiated</td>
<td>6</td>
<td>40.3650</td>
<td>.42866</td>
<td>12.34</td>
<td>-12.7915 -11.8884</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Radiated</td>
<td>6</td>
<td>52.7050</td>
<td>.25042</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impress Direct</td>
<td>non-radiated</td>
<td>6</td>
<td>44.6600</td>
<td>.42048</td>
<td>22.92</td>
<td>-23.4154 -22.4412</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Radiated</td>
<td>6</td>
<td>67.5883</td>
<td>.33163</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glass Ionomer</td>
<td>non-radiated</td>
<td>6</td>
<td>49.1183</td>
<td>.29233</td>
<td>19.39</td>
<td>-19.8012 -18.9887</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Cement</td>
<td>Radiated</td>
<td>6</td>
<td>68.5133</td>
<td>.33762</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Results

The mean microhardness (VHN) values of 3 restorative materials of radiated and non-radiated groups are given in the Table 2 and represented in Fig 3. All the three materials show an increase in microhardness number after radiation. The difference between the radiated and non-radiated groups as evaluated by Independent t-test was found to be statistically significant at the p value <0.001. The highest mean difference of 22.92 was obtained with Impress Direct material, followed by GIC Gold label, type 9 (19.39) and Te-Econom Plus (12.34) respectively (Table 2).
From the table 3, the highest mean difference of 12.28 was seen between the GIC and Te-Econom plus materials. Impress direct and GIC showed the least Mean difference of 2.69. Hence the test denotes that there is a difference in mean microhardness values between these restorative materials at 5% level of significance.

**Table 3 : Results of Pairwise Comparison between the materials**

<table>
<thead>
<tr>
<th>Materials (I)</th>
<th>Materials (J)</th>
<th>Mean Difference (I-J)</th>
<th>Sig.</th>
<th>95% Confidence Interval for Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Te- Econom Plus</td>
<td>Impress Direct</td>
<td>9.589</td>
<td>&lt;0.001</td>
<td>-10.154 -9.024</td>
</tr>
<tr>
<td>Impress Direct</td>
<td>GIC</td>
<td>12.281</td>
<td>&lt;0.001</td>
<td>-12.648 -11.914</td>
</tr>
<tr>
<td>Impress Direct</td>
<td>GIC</td>
<td>2.692</td>
<td>&lt;0.001</td>
<td>-3.103 -2.280</td>
</tr>
</tbody>
</table>

*. The mean difference is significant at 0.05 level.

From the table 3, the highest mean difference of 12.28 was seen between the GIC and Te-Econom plus materials. Impress direct and GIC showed the least Mean difference of 2.69. Hence the test denotes that there is a difference in mean microhardness values between these restorative materials at 5% level of significance.

**Discussion**

Tooth restorations are commonly seen among patients with head and neck cancers [27]. Selection of dental restorative materials on such scenario is of paramount importance to prevent adverse effects to the structure. In this context, determination of material on the basis of their mechanical strength against radiation would be beneficial. Thus, in this study the effects of radiation on 3 different restorative materials was evaluated.

The results showed that the mean micro hardness of 3 restorative materials increased after subjecting to a cumulative dosage of 70Gy. The increase in microhardness property of the materials can be due to increased polymerisation which occurred after radiation exposure [14,15]. The electron beam radiation used here has high dose rate and has low penetrating power compared to any other ionising radiations. It mainly targets the superficial layer and the strength increases as the energy increases by dosage rate. Hence the high degree of polymerisation is accredited to the high dose of radiation which causes alteration in chemical bonds within the product [16]. Radiation is known to build up components of polymer and also undergo cross linkage of chains during chemical reaction which in turn increases the polymer chain [17]. Mechanical properties of these study materials were enhanced as a result of this kind of polymerisation.

In contrast, some of the studies have shown a decrease in microhardness value after subjecting to radiation treatment [18]. Also some researchers have proved increased hardness upto the radiation dosage of 200kGy [19]. In the present study Glass Ionomer Cement, Gold label, Type 9 showed highest hardness value of 49.1 and 68.7 VHN among Non-radiated and radiated groups respectively. As the material is known for its high wear resistance property, it can be justified for the improvised strength seen in the material. The main component of the material, strontium reacts with the calcium present in the saliva forming strontium hydroxyapatite. Further calcium undergoes fusion with the GIC compound during the process imparting strengthening effect to the compound [20].

The nanohybrid composite, Impress direct showed similar strength as that of GIC with microhardness values of 44.6 and 67.5 VHN in non-radiated and radiated groups respectively. This enhancement in the property of the material is attributed due to the presence of nano-fillers like ytterbium trifluoride and aluminosilicate glass in its composition. Researchers have studied similar property to distinguish various Impress Direct compounds effected by consumption of alcohol and radiation. It has proved that Impress direct, translucent opal shades originally have high mechanical properties and also irradiation is known to increase its mechanical strength [21]. Further, Impress direct has also shown increased degree of polymerisation compared to GIC with the mean difference of 22.92. The Radiopaque composite, Te-Econom plus has also
undergone polymerisation with mean microhardness value of 52.7 VHN in radiated groups compared to 40.23 VHN in non-radiated groups. The pair wise comparison has proven that GIC and Te Econom plus has the highest mean difference of 12.28. However, the nano hybrid composites showed better degree of polymerisation, thus it could be termed as more clinically suitable restorative material.

Conclusion

The present study has shown that ionising radiation (Electron Beam Radiation) increases the mechanical strength of the restorative materials. Hence these materials are considered safe for endodontic treatment among head and neck cancer patients. The nano hybrid composite, Impress direct has shown better degree of polymerisation compared to Glass Ionomer Cement and Te- Econom Plus, thus proving to be a clinically suitable restorative material.

References

Validation of Standard of Living Scale with Comparison to Other Socio-Economic Scales in a Semi Urban Area of Mangalore: A Pilot Study

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Abstract
Introduction: Socioeconomic status is an important determinant of health condition of an individual or a family. Many tools are being used to assess the socioeconomic status. Each of the scales have their own advantages and disadvantages. But an appropriate and a standardized tool is yet to be developed.

Objectives: To compare the standard of living based on different socioeconomic scales in a semiurban area of Mangalore and to assess the appropriateness of socioeconomic scales to be used in a semiurban area of Mangalore.

Methodology: A cross sectional study was conducted in households of Kuthar and Manjanady villages of Dakshina Kannada district from June- August 2014. Questionnaire method was used to avail information about the socioeconomic status of the study population. The data was analysed using SPSS 16 software.

Results: Majority (70%) of the study population belonged to class IV of kuppuswamy scale. Whereas according to Modified BG Prasad scale majority of the population belonged to class III (35%) and class II (28%). According to Pareek’s scale around 92% of population belonged to class IV. But when standard of living was assessed majority of them (62%) had high standard of Living.

Conclusions: We found that Standard of living is the better option in assessing the socio-economic status of a household as compared to all other scales whether be it urban, rural or semi urban.

Keywords: socioeconomic status, different socioeconomic scales, Modified Kupuswamy scale, Pareek scale, Modified BG prasad scale and standard of living index.

Introduction
Socio-economic status has been defined as “The position that an individual or family occupies with reference to the prevailing average standards of cultural and material possessions, income and participation in group activity of the community”.

The social status may be inherited, but in modern society it is achieved on the basis of occupation, income, type of housing and neighborhood, membership of the certain associations and organizations, material possessions etc. Socio-economic status also influences the accessibility, affordability, acceptability and actual utilization of various available health facilities.

The Socio-economic status (SES) is an important determinant of health and nutritional status as well as of mortality and morbidity. The variables that affect socio-economic status are different in case of urban and rural societies. Hence, separate scales are used for measuring the socio-economic status in rural and urban areas.

Socio-economic status is a important tool to identify below poverty line (BPL)families in order to identify the actual beneficiaries who will be benefitted by the government programs. According to the report of expert group of Government of India Planning Commission 2014 estimates...
that 30.9% of rural population and 26.4% of urban population was below poverty line in 2011-2012. The all-India ratio was 29.5%.

There are different socio-economic scales which are widely used they are Modified Kuppuswamy's socio-economic status scale for use in urban areas by employing three major characteristics namely education, occupation and monthly income from all sources, Modified BG Prasad for urban and rural areas based on the per capita income of the family and number of family members and Pareek's scale in rural area which is classified based on caste, occupation, education, land, social participation, family members, housing conditions, farm power and material possession. Other scales are Standard of living and wealth index which is based on the housing conditions and material possessions.

Only estimation of the Income, occupation and education does not correctly estimate their socioeconomic status. Availing an exact family income is difficult and most of time it is misleading in assessment of socio-economic status.

To understand the appropriateness of different socio-economic status in a semi-urban area, a study was undertaken to determine so.

Objectives
1) To compare the standard of living based on different socioeconomic scales in a semi-urban area of Mangalore
2) To assess the appropriateness of socioeconomic scales to be used in a semi-urban area of Mangalore

Methodology
Study setting
This was a community based study, conducted in Kuthar and Manjanady villages, rural field practice areas attached to The Department of Community Medicine, K S Hegde Medical Academy, Mangalore, Dakshina Kannada District which is covered under the Grama Kshema Project.

Sample size & Sampling method
All the households covered under the Grama Kshema Project was included. Totally 40 households were included in the study.

Study duration
The study was conducted over a period of 1 month (June 15th-August 15th 2014)

Method of data collection
Households were consecutively approached to assess their socio-economic status.

The data was collected by interview method using structured questionnaire method of different socio-economic scales available after obtaining an oral consent. The data was collected by a single interviewer who was trained on all the four classes of socio-economic scales (1st author) to avoid inter-observer and intra-observer bias.

For comparison of the scales, in the semi-urban area four commonly used SES scales were applied on the same family at the same time one after the other by the investigator; viz. Standard of Living, Kuppuswamy scale, Pareek scale and Modified BG Prasad scale. The correction factor for Modified BG Prasad and Modified Kuppuswamy scale were calculated by taking Consumer Price Index (2014) from the Ministry of Statistics and Program Implementation, Government of India. The households were classified based on different available socio-economic scales and later assessed to know the appropriateness of each scales.

Statistical analysis
The collected data was recorded using Microsoft excel. The data was analyzed using SPSS version 16. Proportions and comparisons were done. To measure the agreement between the scales, Spearman's rank correlation was applied.

Ethical Considerations
The following ethical issues were considered for this study
1. There is no physical harm to the participants as there was no intervention or collection of blood sample.
2. Oral consent was obtained from all the participants.
Results
Among the 40 families surveyed, it was observed that, according to Standard of living Index majority (62%) belonged to high class, 35% belonged to Middle class and 3% belonged to low class. When for the same families Kuppuswamy scale was applied majority (70%) belonged to upper lower class (IV), 17% belonged to lower middle class (III), 10% belonged to upper middle (II) and 3% belonged to lower class (V). When Pareek scale was applied, majority (92%) belonged to the upper lower class (IV), 5% belonged to lower middle class (III) and 3% belonged to lower class (V). Similarly 35% belonged lower middle class (III), 28% upper middle class, 20% upper lower class (IV), 15% lower class (V) and 2% upper class (I) when Modified B G Prasad scale was applied.

Among the 25 families classified as high class in the SLI scale, 60% belonged to upper lower class (class IV), 24% belonged to lower middle class (class III) and only 16% belonged to upper middle class (class II) of Kuppuswamy scale. Families belonging to medium class in SLI scale, 92.9% belonged to class IV and 9.1% belonged to class III of Kuppuswamy scale. Only in families classified as low class in SLI scale, all them belonged to class V of Kuppuswamy.

Similarly when SLI was compared with Modified BG Prasad scale. In families classified as high class in SLI scale, 40% families belonged to upper middle class(Class II), 32% of them belonged to lower middle(Class III) 16% belonged to upper lower(Class IV), 8% of families belonged to lower class(Class V) and only one family(4%) belonged to upper class(Class I) according to B.G.Prasad Classification. In families belonging to medium class in SLI scale, 42.9% belonged to class III, 28.6% belonged to class IV, 21.4% to class V and 7% belonged to class II of Modified B G Prasad scale. Only in families classified as low class in SLI scale, all them belonged to class V Modified BG Prasad scale.

When compared standard of living with pareek scale. In families classified as high class in SLI, 92% belonged to upper lower class (class IV) and 2(8%) families belonged lower middle class (class III) of pareek scale. In Families classified as middle and low class in SLI scale, all them belonged to class IV and V of Pareek’s scale respectively.

When we compared Modified B G Prasad with the kuppuswamy scale. There was no similarity in class I, a similarity of 27% in class II, 14.3% in class III, 87.5% in class IV and 16.7% in class V between Modified BG Prasad and Kuppuswamy was seen.

When Pareek scale was compared with the kuppuswamy scale. There was no similarity between class I, II, III, but a similarity of 75.7% was seen in class IV and 100% in class V between Pareek scale and Kuppuswamy was seen.

When Pareek scale was compared with the Modified B G Prasad scale. There was no similarity between class I, II, III, but a similarity of 21.6% was seen in class IV and 100% in class V between Modified B G Prasad scale and Kuppuswamy.

A rank correlation computed between SLI and Kuppuswamy scale with the above data shows that there is a positive correlation agreement (R = 0.427, P =0.006) between them. There was also a similar observation between SLI and Modified BG Prasad scale (R=0.428 and P value=0.006) and SLI and Pareek’s scale (R=0.322 and P value=0.042).

Discussion
In this study according to Standard of living Index majority (62%) belonged to high class, Similarly according to NFHS 3 data also 63% of the Indian population were above poverty line.(9)

However, majority of the same families were grouped as upper lower class (class IV) according to kuppuswamy scale, upper lower class (class IV) according to Pareek’s...
scale and according to Modified BG Prasad they belonged to upper (class II) and lower middle class (class III) which was similar to the previous study conducted by Masthi RNR et al.  

Around 60% of families of class IV Kuppuswamy, 92% of lower (class IV) class in Pareek scale and 72% of the upper middle and lower middle class of Modified BG Prasad scale had also been placed under high in SLI.

Correlation was applied between the SLI and Kuppuswamy scale, SLI and Modified BG Prasad scale and SLI and Pareek scale. It was seen that all the other scales when correlated with SLI had a positive correlation. Even though they had positive correlation the discrepancy among the classes was seen. Many of the population who had high standard living...
belonged to IV class of kuppuswamy, II and III of Modified BG Prasad and IV class of pareek. But one family which had low standard of living belonged to class V of kuppuswamy, BG Prasad and Pareek scale. So, Kuppuswamy, Modified BG Prasad and Pareek scales can determine the lower class but determining the upper classes it was difficult.\(^{(9)}\)

Hence, Kuppuswamy scale, Modified B G Prasad scale and Pareek’s scale which is more focused on income and inappropriate possessions did not give the approximate picture of living standards.

The modified Kuppuswamy scale which primarily considers education, occupation and Income and does not give importance to possessions and number of family members. Similarly Modified BG Prasad scale considers only family Income and Family members which gives no importance to other criteria such as material possessions.

As far as Pareek scale is concerned even though material possession is included it is inappropriate. Pareek scale considers only agricultural possessions and does not include the household possessions. The earlier study said that SLI stands out as a unique reliable measure of SES by taking into consideration the wealth possession which we agree with it.\(^{4}\)

Even though wealth index is an appropriate measure of socioeconomic status. It can be considered only in large survey and not in individual case taking or interventions as it has many components included in it.\(^{9}\)

As per our study we could see that the NFHS 3 data which talks about wealth index (Quintiles) is similar to SLI. But, wealth index does not go with any other socioeconomic scales. It would be better to use SLI to obtain high specificity even for large surveys.\(^{9}\)

But possessions of things should be increased in SLI for it to be more appropriate.

Socio-economic status is an important indicator of the health status. Hence along with material possessions and number of family members there is a need to add all expenditure of the family.

There is also a difficulty in updating the Kuppuswamy and Modified BG Prasad scale due to Inflation and change in the CPI (consumer price Index) every month. Again CPI according to the Labour Bureau, Government of India, 2014 is different from the CPI according the Ministry of Statistics and Programme Implementation, Government of India. So determining CPI for these scales are going to be difficult. So, a single nationalized CPI for calculating socio-economic status would be helpful.

Limitations of this study were that it was done on a small sample because it is a pilot study. The study is being planned on a larger scale with better representation of the households so as to get a better picture and the results published at a later date.

Conclusion
As always been seen the different socio-economic scales used in different regions of India have been inappropriate to assess the standard of living and status of people in the society which is also endorsed in our study. We found that Standard of living is the better option in assessing the socio-economic status of a household as compared to all other scales whether be it urban, rural or semi urban. But to add on, the existing SLI scales needs some more modification too.

Recommendations
Along with the education, occupation and income it is important to consider their material possessions, family members, expenditure on health, food, education, sanitation and occurrence of major events at the family. Even though many scales are being used to assess the socio-economic status each of these scale have their own advantages and disadvantages. Hence, an appropriate socio-economic scale is in need to be developed.
References

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Short - Term Effects of Eccentric Hip Abductors and Lateral Rotators Strengthening In Sedentary People with Patellofemoral Pain Syndrome on Pain and Function : A Randomized Control Trail

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Abstract

Purpose: To investigate the influence of additional eccentric strengthening to the hip abductor and lateral rotator musculature on pain and function in sedentary people with Patellofemoral pain syndrome (PFPS).

Methods: 30 sedentary patients between 18 and 40 years of age, with a diagnosis of PFPS, all the subjects received treatment for a period of 4 weeks and the subjects were randomly assigned to Control group (CG) and Experimental group (EG). The patients in the Control group (n = 15) performed a conventional knee-stretching and strengthening program, whereas, patients in the Experimental group (n = 15) performed the same exercises as those in the control group in addition received eccentric strengthening exercises for the hip abductors and lateral rotators. An 11-point numeric pain rating scale (NPRS), the Lower Extremity Functional Scale (LEFS) and the Anterior Knee Pain Scale (AKPS) were used as outcome measures during the baseline and at the end of 4 weeks.

Results: Statistics were retrieved using SPSS 16, paired ‘t’ test was conducted to compare AKPS and LEFS values, whereas, Mann-Whitney U test was used for NPRS value between the groups. After 4 weeks of treatment, the control group, pre and post-test value for AKPS (p<0.001), LEFS (P<0.001), NPRS (p<0.001) shows a statistical significance and even in the experimental group, pre and post-test value for AKPS (p<0.001), LEFS (P<0.001), NPRS (p<0.001) shows a statistical significance in pain and function, but comparing both the group experimental group is significantly more better AKPS (p=0.002), LEFS (P<0.001), NPRS (P<0.001) than a control group.

Conclusion: short term Knee strengthening exercises supplemented by eccentric hip abductor and lateral rotator musculature–strengthening exercises were more effective than knee exercises alone in improving function and reducing pain in sedentary people with PFPS.

Keywords: Patellofemoral pain syndrome, eccentric strengthening, hip abductor and external rotator strengthening, Anterior knee pain scale, Lower Extremity Functional Scale

Introduction

Patellofemoral pain syndrome (PFPS) is one of the commonest and challenging knee pathologies seen in the physical therapy outpatient clinic. It is frequently seen in adolescents and younger adults. It is higher for women than for men (2:1). The most typical symptom of PFPS is a diffuse peripatellar and retropatellar pain, typically provoked by ascending or descending stairs, squatting, cycling and sitting with flexed knees for prolonged periods of time. The exact cause for PFPS is still unknown but has been proposed to be multifactorial. The most commonly accepted hypothesis of the cause of PFPS is that abnormal patellar tracking increases PFJ stress and causes subsequent wear on the articular cartilage.

Historically, PFPS has been linked with quadriceps muscle impairment. But more recent research regarding PFPS has focused on strength deficits of the proximal hip musculature as a contributor to this disorder causing...
femoral adduction and medial rotation during weight-bearing activities abnormal patellar tracking.\textsuperscript{7,8,9}

The majority of published material on conservative treatment of PFPS has focused on Patellar bracing, Taping, Exercise, stretching and use of foot orthoses to attempt to alleviate pain and restore patients to full-functioning status.\textsuperscript{10} The Quadriceps strengthening exercises have been repeatedly demonstrated to be an effective intervention for individuals with PFPS.\textsuperscript{11, 12} But based on the recent studies, several articles have reported associations between hip strength and knee pain, including studies that suggest hip strengthening may improve knee pain. Especially poor eccentric hip abductors and lateral rotators muscles control can result in femoral adduction and medial rotation during weight-bearing activities, leading to a predisposition to lateral patellar tracking.\textsuperscript{13,14} But the level of evidence to recommend eccentric hip strengthening for the treatment of PFP is currently lacking. So this created a scope to for further research in role of eccentric hip musculature strengthening especially in sedentary people with PFPS as majority study where concentrated on female athletes, therefore there is a need to evaluate the effect of hip musculature strengthening on on a sedentary population.

Materials and Methods

Subjects

Thirty Subjects with PFPS of both sexes, between 18 and 40 years of age were selected from the population group satisfying the inclusion and exclusion criteria. Informed consent was obtained from the subjects before recruitment into the study. PFPS patients are diagnosed and referred from the Department of Orthopaedics, K.S Hegde Charitable hospital, Mangalore. Inclusion criteria; Location of symptoms (peripatellar and/ or retropatellar) and the reproduction of pain with activities from at least 3 of the follow - ascending/descending stairs, squatting, kneeling, and prolonged sitting, insidious onset of these symptoms being unrelated to a traumatic incident, pain persistent for at least 1 month , presence of pain on palpation of the patellar facets; on stepping down from a 25-cm step/ double-legged squat, all patients in this study will be sedentary according to the criteria of ACSM. Exclusion criteria ; History of patellar fracture/dislocation/ knee surgery, pregnancy , Signs of nerve root compression , previous surgery around knee joint, systemic disorder ,hip or lumbar referred pain, tenderness over the patellar tendon, iliotibial band, or pes anserinus tendons, a positive finding on any special tests aimed to identify knee ligament or meniscal injuries or other intra-articular pathologic

![Participant flow diagram](image-url)
conditions. The subjects included in this study were randomly assigned into two groups of equal number: control; all patient in this group performed stretching and quadriceps strengthening exercise and Experimental; patients performed all the exercise given to the control group, in addition perform eccentric hip abduction and external rotation strengthening for a period of 4 weeks.

For evaluation- Self-Administered Anterior Knee Pain Scale (AKPS), Lower extremity functional scale (LEFS) and 11 point numeral pain rating scale (NPRS) were used during pre-treatment and post treatment (after 4 weeks of treatment).

Self-Administered Anterior Knee Pain Scale (AKPS) it is a 13-item questionnaire that contains questions related to various levels of knee function and Response scores are summed. Total score is 100 and higher scores indicate greater function and lower levels of pain. kujala.pdf

Lower extremity functional scale (LEFS) - The LEFS is a 20-item functional assessment tool that rates the level of difficulty of functional tasks from 0 (extreme difficulty) to 4 points (no difficulty), yielding a maximum score of 80 points, with lower scores indicating more disability. LEFS

11 point numeral pain rating scale (NPRS) - The NPRS is an 11-point scale that ranges from 0 (no pain) to 10 (worst imaginable pain) and subjects were instructed to circle pain level during ascending and descending functional activity. Table 1 and 2 explains the treatment protocol for control and experiment group

### Table 1 : control group treatment protocol

<table>
<thead>
<tr>
<th>Activity</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stretching (all exercise session)</td>
<td>3 repetitions/30-seconds hold</td>
</tr>
<tr>
<td>• Sitting hamstring stretch</td>
<td></td>
</tr>
<tr>
<td>• Sitting patellar mobilization</td>
<td></td>
</tr>
<tr>
<td>• Standing quadriceps stretching</td>
<td></td>
</tr>
<tr>
<td>• Standing calf stretching</td>
<td></td>
</tr>
<tr>
<td>• Standing iliotibial band stretch</td>
<td></td>
</tr>
<tr>
<td>Week 1 &amp; 2 exercise</td>
<td></td>
</tr>
<tr>
<td>• Isometric quadriceps contractions while sitting with 90° of knee flexion</td>
<td>2 sets of 10 repetitions/10-second hold 3 sets of 10 repetitions</td>
</tr>
<tr>
<td>• Straight-leg raise in supine position</td>
<td></td>
</tr>
<tr>
<td>• Mini squats to 40° of knee flexion</td>
<td></td>
</tr>
</tbody>
</table>

### Weeks 3 and 4 exercises
- Wall slides (0–60° of knee flexion)
- Steps-up and steps-down from a 20-cm step
- Forward lunges (0–45° of knee flexion)
- Balance exercises: unilateral stance on the floor and on a trampoline, with opened and closed eyes

### Table 2 : experimental group treatment protocol

<table>
<thead>
<tr>
<th>Activity</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same as control group, below mentioned exercises are added from 1° week to 4° week and exercise weight is progressed based on DAPRAE method.</td>
<td></td>
</tr>
<tr>
<td>• In side lying with the hips and knees slightly flexed with free weight, the patient will be passively taken to abduction - lateral rotation then patient has to eccentrically drop the hip towards adduction and medial rotation direction.</td>
<td></td>
</tr>
<tr>
<td>• Side-lying patient will be passively taken to abduction controlled hip adduction with extended knee</td>
<td>2 sets of 15 repetitions 2 sets of 15 repetitions</td>
</tr>
</tbody>
</table>

### Table 3 : Demographic variables

<table>
<thead>
<tr>
<th>Group</th>
<th>Experimental group N=15</th>
<th>Control group N=15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age [mean ± SD]</td>
<td>29.06±6.6</td>
<td>26.42±4.2</td>
</tr>
<tr>
<td>Gender [Male &amp; female]</td>
<td>3 and 12</td>
<td>5 and 10</td>
</tr>
<tr>
<td></td>
<td>[20% and 80%]</td>
<td>[33% and 67%]</td>
</tr>
</tbody>
</table>
Table 4: Description of variables

<table>
<thead>
<tr>
<th>Group</th>
<th>Experimental group N=15</th>
<th>Control group N=15</th>
</tr>
</thead>
<tbody>
<tr>
<td>AKPS first assessment</td>
<td>66.3±9.92 49/87</td>
<td>72.8±11.71 52/90</td>
</tr>
<tr>
<td>(mean ± SD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(min./max. score)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AKPS second assessment</td>
<td>84.9±8.11 39/94</td>
<td>82.2±11.51 42/90</td>
</tr>
<tr>
<td>(mean ± SD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(min./max. score)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEFS first assessment</td>
<td>40.2±13.15 23/72</td>
<td>48.5±15.29 29/73</td>
</tr>
<tr>
<td>(mean ± SD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(min./max. score)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEFS second assessment</td>
<td>66.2±7.49 32/73</td>
<td>56.9±17.19 28/65</td>
</tr>
<tr>
<td>(mean ± SD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(min./max. score)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPRS first assessment</td>
<td>5.8±1.24 3/8</td>
<td>4.0±2.01 2/8</td>
</tr>
<tr>
<td>(mean ± SD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(min./max. score)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPRS second assessment</td>
<td>2.3±1.40 1/6</td>
<td>2.5±1.40 3/7</td>
</tr>
<tr>
<td>(mean ± SD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(min./max. score)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Paired t test within Experimental group

<table>
<thead>
<tr>
<th>Experimental group</th>
<th>Difference</th>
<th>95% Confidence Interval</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AKPS pre-post</td>
<td>1.86±7.53</td>
<td>14.4 to 22.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>LEFS pre-post</td>
<td>2.59±9.46</td>
<td>20.69 to 31.17</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>NPRS pre-post</td>
<td>3.53±0.99</td>
<td>2.98 to 4.08</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

The above table illustrates the pre and post-test values in experimental group and it is clear based on the (p <0.001) that there is a significant difference within the group in the entire variable. Therefor experiment group showed improvement after the intervention in all the outcome scale.

Table 6: Paired t test within control group

<table>
<thead>
<tr>
<th>Control group</th>
<th>Difference</th>
<th>95% Confidence Interval</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AKPS pre-post</td>
<td>9.42±7.02</td>
<td>5.37 to 13.48</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>LEFS pre-post</td>
<td>8.42±5.10</td>
<td>5.47 to 11.37</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>NPRS pre-post</td>
<td>1.57±0.93</td>
<td>1.03 to 2.11</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

The above table illustrates the pre and post-test values in the control group and it is clear based on the (p <0.001) that there is a significant difference within the group in the entire variable. Therefor control group also showed an improvement in all the outcome scale.

Table 7: Independent t test between the groups

<table>
<thead>
<tr>
<th>Between the groups</th>
<th>Mean ± S.D</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AKPS</td>
<td>EG</td>
<td>18.60±7.53</td>
</tr>
<tr>
<td></td>
<td>CG</td>
<td>9.66±6.83</td>
</tr>
<tr>
<td>LEFS</td>
<td>EG</td>
<td>23.93±9.46</td>
</tr>
<tr>
<td></td>
<td>CG</td>
<td>9.73±7.05</td>
</tr>
<tr>
<td>NPRS</td>
<td>EG</td>
<td>3.53±0.99</td>
</tr>
<tr>
<td></td>
<td>CG</td>
<td>1.66±0.97</td>
</tr>
</tbody>
</table>

EG-Experimental group, CG-Control group
The above table illustrates the pre and post-test values in all the variable between the Experimental and Control group showed, experimental group is significantly more better AKPS (p=0.002), LEFS (p<0.001), NPRS (P<0.001) than a control group.
Result
After 4 weeks of treatment, the control group, pre and post-test value for AKPS (p<0.001), LEFS (P<0.001), NPRS (p<0.001) shows a statistical significance and even in the experimental group, pre and post-test value for AKPS (p<0.001), LEFS (P<0.001), NPRS (p<0.001) shows a statistical significance in pain and function, but comparing both the group, experimental group is significantly more better AKPS (p=0.002), LEFS (P<0.001), NPRS (P<0.001) than a control group.

Discussion
The results of the present study demonstrated that a 4-week intervention either consisting of knee-strengthening exercises or knee-strengthening exercises supplemented by eccentric hip-strengthening exercises both led to improved function and reduced pain in sedentary population with PFPS. For most outcome measures, greater improvement was noted in the group combining knee and hip exercises, the importance of hip abductor and lateral rotator muscle strengthening in the treatment of PFPS has received increased attention in recent years. This approach is based on several studies that have demonstrated weakness of the hip abductors and lateral rotators in patients with PFPS. 8,14

The eccentric hip strengthening was supported by Rodrigo de at all (2009) eccentric hip abduction mean peak torque was 28% lower in the PFPS group than in the control group. 15 A similar study done by Kimberly l. dolak at all (2012) showed that the patients with PFPS, initial hip strengthening may allow an earlier dissipation of pain than exercises focused only the quadriceps. 16

Accordingly, some authors have also speculated that simple daily activities were sufficient to lead to poor knee and hip kinematics, leading to a reduction of the patellofemoral contact area and increased joint stresses. 17,18 Therefore in this study, these concepts were applied to sedentary population with PFPS.

This study witnessed more percentage of young and sedentary females with PFPS, possibly due to the commonly noted hip muscle weakness that may change lower limb kinematics. 14

Conclusion
short term Knee strengthening exercises supplemented by eccentric hip abductor and lateral rotator musculature–strengthening exercises were more effective than knee exercises alone in improving function and reducing pain in sedentary people with PFPS.

Limitations of the study
• Sample size was small and each group had less male than a female and male so it’s difficult to generalise the effect.
• The patients in both groups were allowed to take pain and anti-inflammatory medications for first 4 days as prescribed by an Orthopaedician.
• There was no follow up carried out to see the prolonged effect of the exercise
• In this study all outcome measurement used mainly concentrated on subjective assessment.

References


Local Drug Delivery in periodontal diseases. .......A Review

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Abstract
Periodontitis is an immuno-inflammatory disease of the tissues surrounding the teeth. Various treatment modalities like mechanical debridement and use of antimicrobials have been followed in the treatment of such conditions. Introduction of local drug delivery system in the periodontal pocket is a promising therapeutic modality for achieving better clinical outcomes when used as an adjunct to conventional non surgical periodontal therapy. Intensive research efforts are now focussed on the development of new strategies for more effective treatment.

Keywords : Periodontitis, local drug delivery, scaling and root planning, antimicrobial agent.

Introduction
The inflammation in the periodontal tissue is initiated by microbial plaque and bacterial infection. In the periodontal pocket the bacteria form a highly structured and complex biofilm. As this continues, the biofilm reach far subgingivally and it becomes difficult for the patient to reach it during oral hygiene practices. Traditional treatment options for such conditions includes mechanical debridement aimed at removing the subgingival flora and providing a clean, smooth and compatible root surfaces. But, in several instances, the complex anatomy of the root and the location of the lesion may hamper the treatment and prevent sufficient reduction of the bacterial load.

Antibacterial agents have been used along with mechanical debridement in the management of periodontal infection. The effectiveness of all the methods are limited due to the lack of accessibility in the periodontal pocket. Periodontal pocket provides an ideal environment for the growth of anaerobic pathogenic bacteria such as Actinobacillus actinomycetem comitans, Porphyromonas gingivalis and Prevotella intermedia. For the effective treatment, the antibiotic must reach the depth of the pocket and produce gingival fluid concentrations higher than the minimum inhibitory concentrations (MIC) of the suspected pathogens. Recent advance in science and technology has revolutionized the basic outlook and approach to the problems of periodontal disease. Earlier it was assumed that periodontal problems were invariably progressive and the morbid effects increase with passage of time. A thorough understanding of the etiopathogenesis of periodontal disease has provided the clinicians and researchers with a number of diagnostic tools and technique that has widened the treatment options.

History
Ever since the introduction of systemic antibiotics, various drugs have been used in the treatment of periodontitis. The disadvantages of systemic antibiotics like bacterial resistance, superimposed infections, uncertain patient compliance, nausea, vomiting and gastrointestinal disturbances led to the introduction of local drug delivery as the treatment option. It was in the year 1979, Dr. Max Goodson et al first proposed the concept of controlled delivery in the treatment of periodontitis. Since then, a number of studies have been carried out over the years.
with different antimicrobial agents and in different clinical situations.

**Classification**
Various classification systems were evolved.

I Based on the application [Rams and Slots] 1996
1. Personally applied (in patient home self-care)
   A. Nonsustained subgingival drug delivery
      - Home oral irrigation
      - Home oral irrigation jet tips
      - Traditional jet tips
      - Oral irrigation (water pick)
      - Soft cone rubber tips (pick pocket)
   B. Sustained subgingival drug delivery
2. Professionally applied (in dental office)
   A. Nonsustained subgingival drug delivery
      - Professional pocket irrigation
   B. Sustained subgingival drug delivery
      - Controlled release devices
      - Hollow fibres
      - Dialysis tubing
      - Strips
      - Films

II Based on the duration of medicament release
(Greenstein and Tonetti 2000)
A. Sustained release devices – Designed to provide drug delivery for less than 24 hours
B. Controlled release devices – Designed to provide drug release that at least exceeds 1 day or for at least 3 days following application (Kornman 1993)

III Depending on degradability.
1. Nondegradable devices (first generation)
2. Degradable devices (second generation)

Various drug delivery systems for treating periodontitis are fibres, films, injectable systems, gels, strips, compacts, vesicular system, microparticles and nanoparticles.

Currently available locally delivered antimicrobials in periodontal therapy,

**Tetracycline:** containing fibers are the first available local drug. It had ethylene/vinyl acetate copolymer fiber with diameter of 0.5 mm, containing tetracycline 12.7 mg per 9 inches. The Actisite tetracycline fibres have been approved both by the United States Food and Drug Administration (FDA) and by the European Union’s regulatory agencies. These are non-resorbable, safe, inert copolymer loaded with 25% w/w tetracycline HCl. It maintains constant concentrations more than 1000 µg/mL for a period of 10 days. Follow up showed reduction in the subgingival microbiota. Biodegradable tetracycline fibre has been developed with base of collagen film, which is commercially available as Periodontal Plus AB. It offers the advantage of no second appointment for removal as it degrades within 7 days. Tetracycline seratiocetide containing gels were evaluated in a study by Maheshwari et al. 2005. This combination containing thermoreversible gel was clinically effective along with scaling and root planing. Various studies were conducted with tetracycline as monotherapy and also as an adjunctive to scaling and root planing. In a 6-month multi-center evaluation of adjunctive tetracycline fiber therapy by Newman et al. 1994, showed that fiber therapy significantly enhanced the effectiveness of scaling and root planing in the management of localised recurrent periodontitis sites, in patients receiving regular supportive periodontal therapy.

**Doxycycline:** Atridox is a FDA approved 10% doxycycline in a gel system using a syringe. GCF levels reached its peak to 1,500-2,000 in 2 hours following treatment with Atridox. These levels remained above 1000 µg/mL through 18 hours, and then levels gradually declined. Walker et al. 2000 in an attempt to determine the effectiveness of sustained-release, biodegradable gel containing 8.5% doxycycline on the anaerobic flora and on antibiotic susceptibility patterns associated with subgingival plaque and saliva reported that the treatment significantly reduced the anaerobic population in plaque but did not result in change in either number of resistant bacteria or the acquisition of antibiotic resistance.
Minocycline - Arestin is a FDA approved locally delivered, sustained release form of minocycline microspheres for subgingival placement. The 2% minocycline is encapsulated into bioresorbable microspheres in gel carrier.\(^1\)

Stefan Renvert et al 2008, conducted a study to compare

### Various agents available in market \(^{2-5}\):

<table>
<thead>
<tr>
<th>Agent</th>
<th>Product available</th>
<th>Dosage form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetracycline</td>
<td>Actisite (25%w/v tetracycline Hcl)</td>
<td>Non resorbable fiber</td>
</tr>
<tr>
<td></td>
<td>Periodontal plus AB(2mg of Tetracycline in 25mg of collagen)</td>
<td>Resorbable fiber</td>
</tr>
<tr>
<td>Doxycycline</td>
<td>Atridox (10% Doxycycline)</td>
<td>Bio degradable mix in syringe.</td>
</tr>
<tr>
<td>Minocycline</td>
<td>Dentomycin gel (2% Minocycline)</td>
<td>Biodegradable gel</td>
</tr>
<tr>
<td></td>
<td>Arestin (2% Minocycline)</td>
<td>Biodegradable mix in syringe.</td>
</tr>
<tr>
<td></td>
<td>Periocline (2.1%w/v Minocycline)</td>
<td>Ointment</td>
</tr>
<tr>
<td>Metronidazole</td>
<td>Elyzol (25% Metronidazole)</td>
<td>Biodegradable gel</td>
</tr>
<tr>
<td>Chlorhexidine</td>
<td>Periochip (2.5mg Chlorhexidine)</td>
<td>Biodegradable chip</td>
</tr>
<tr>
<td></td>
<td>Periocol CG (2.5mg Chlorhexidine)</td>
<td>Biodegradable chip</td>
</tr>
<tr>
<td></td>
<td>Chlosite (1.5% Chlorhexidine)</td>
<td></td>
</tr>
</tbody>
</table>

Recently various newer drugs have been tried to determine their efficacy.

<table>
<thead>
<tr>
<th>Authors &amp; Year</th>
<th>Aim of the study</th>
<th>Major outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vijay Kumar Chava et al(^{17})</td>
<td>develop a thermo-reversible sustained-release green tea gel and effects on patients with chronic periodontitis.</td>
<td>use of local application of green tea gel along with conventional therapy showed greater reduction of pocket and inflammation.</td>
</tr>
<tr>
<td>A R Pradeep et al(^{16})</td>
<td>the efficacy of varying concentrations of subgingivally delivered 0.5%,1%,metformin in the treatment of chronic periodontitis</td>
<td>mean reduction of pocket depth and mean clinical attachment level was greater in metformin group than the placebo group. The greatest reduction was found in 1% metformin group.</td>
</tr>
<tr>
<td>A R Pradeep et al(^{17})</td>
<td>to evaluate the efficacy of subgingivally delivered 1.2 % Atorvastatin in patients with chronic periodontitis</td>
<td>mean pocket depth , clinical attachment level gain was greater in patients with Atorvastatin than the placebo.</td>
</tr>
<tr>
<td>Ray C Williams et al(^{20})</td>
<td>Minocycline spheres in chronic periodontitis</td>
<td>mean reduction of probing depth was improved in group receiving minocycline spheres along with scaling root planing when compared to group with Scaling and root planing alone.</td>
</tr>
<tr>
<td>Amitha Ramesh et al(^{20})</td>
<td>evaluation of subgingival application of chlorhexidine varnish and chlorhexidine gel as an adjunct to full mouth scaling and root planing in case of moderate to deep periodontal pocket subjects.</td>
<td>combination of varnish and gel with scaling and root planing had better clinical outcome.</td>
</tr>
<tr>
<td>Esha Agarwal et al(^{22})</td>
<td>Efficacy of 0.5 % Clarithromycin gel with and without scaling root planing</td>
<td>improved clinical outcomes in Clarithromycin gel and scaling and root planing when compared to group that received scaling and root planing alone</td>
</tr>
<tr>
<td>A R Pradeep et al(^{22})</td>
<td>Efficacy of 1 % Alendronate gel in intrabony defects.</td>
<td>greater mean percentage of bone fill, probing depth reduction and clinical attachment gain was seen in the group receiving alendronate gel than placebo.</td>
</tr>
<tr>
<td>A R Pradeep et al(^{22})</td>
<td>Efficacy of 1% Alendronate gel in class II Furcation defects</td>
<td>mean probing depth reduction, mean relative vertical and horizontal clinical attachment level in group that received gel in class II furcation defects compared to placebo.</td>
</tr>
<tr>
<td>Renvert et al(^{15})</td>
<td>local minocycline microspheres or chlorhexidine gel following debridement in periimplantitis cases.</td>
<td>use of minocycline resulted in Significant reduction in mean probing pocket depths.</td>
</tr>
</tbody>
</table>
25%w/v tetracycline HCl

10% Doxycycline

25% Metronidazole

2% Minocycline

2.5mg Chlorhexidine
minocycline on probing depths with chlorhexidine at days 30, 90, and 180 (P = 0.5, P = 0.01, and P = 0.04, respectively). The use of repeated local antibiotic as an adjunct to the mechanical treatment of peri-implantitis lesions demonstrated improvements in probing depths that were significantly different from controls and were sustained for 6 months. It was concluded that for greater benefit the treatment may have to be repeated.¹⁴

Metronidazole: Elyzol is a topical medication containing an oil-based metronidazole 25% dental gel, applied in viscous consistency to the pocket. Yeal Shifrovitch et al 2009 in a study enabled the understanding of metronidazole-release kinetics from bioabsorbable polymeric films and demonstrated good biocompatibility and the ability to inhibit Bacteroides fragilis growth; therefore, they may be useful in the treatment of periodontal diseases.¹⁵

Chlorhexidine: Periochip is a small chip composed of biodegradable hydrolysed gelatin matrix, cross-linked with glutaraldehyde and also containing glycerine and water, into which 2.5 mg of chlorhexidine gluconate has been incorporated per chip. It is a FDA approved small, orange brown, chip measuring 4.0x 0.5x 0.35mm in a biodegradable matrix of hydrolysed gelatin.

Studies showed reduction in the numbers of the putative periodontopathic organisms Porphyromonas gingivalis, Prevotella intermedia, Bacteroides forsythus, and Campylobacter rectus after placement of the chip.² Study by Soskolne W.A in 1999 showed that there was an initial peak concentration of chlorhexidine in gingival crevicular fluid at 2 hour after the chip was introduced. Slightly lower concentrations being maintained over next 96 hrs. Total degradation occurred between 7-10 days after insertion.¹⁶

Conclusion

Based on the available evidence, the local drug delivery into the periodontal pocket can improve the periodontal health. However these drugs fail to completely replace the conventional scaling and root planning. Thus the benefit of these drugs as a mono therapy is questionable. When compared to systemic antimicrobials, the local drug delivery will reduce the developing drug resistant bacterial strain which is of current worldwide concern. Also, the controlled release properties can be applied as a therapeutic component in the effective management of localised persisting lesions. Local drug administration should be based on patient clinical findings, scientific evidence and proper diagnosis.

Thus, it can be concluded that local drug delivery though not a substitute for the conventional therapy, can be of added benefit if used as an adjunct with the conventional scaling and root planning.

References

15. Shifrovitch Y, Binderman I, Bahar H, Berdicevsky I, Zilberman M.


Aniridia : A window to wilm's tumour

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Introduction
Aniridia in majority of the cases occurs isolated without any systemic involvement due to dominantly inherited mutations or deletions of the paired box gene-6 (PAX6) where as in minority of cases it occurs as part of the WAGR (Wilms tumor-aniridia-genital anomalies-retardation) syndrome caused by deletion of 11p13, which includes the Wilms’ tumor (WT1) and aniridia gene (PAX6) loci. The major diagnostic feature is congenital partial or complete hypoplasia of the iris; foveal hypoplasia with reduced visual acuity and early onset nystagmus. Other associated ocular abnormalities include cataract, glaucoma and corneal opacification and vascularization. Our case was diagnosed with aniridia leading to diagnosis of Wilm’s tumour along with vitamin A deficiency.

Case Report
Twelve months old male child presented to us with history of photophobia and whitish lesion in right eye. On ophthalmological examination visual acuity was 20/30 at 38cms with Teller’s acuity chart. Conjunctiva of right eye showed bitot’s spot temporally and left eye showed conjunctival xerosis. Aniridia in both eyes with clear lens (Figure1). Bilateral fundus was normal. There was no family history of aniridia or renal tumors. No delay in language and gross-motor development.

Subsequently child was referred to nephrologist and was diagnosed with Wilm’s tumour. He underwent partial nephrectomy surgery and is on regular cycle of chemotherapy (adrimycin). Child was started immediately on vitamin A 1,00,000 IU I.M, subsequent next day and 4weeks. Follow up after one month showed resolution of bitot’s spot and conjunctival xerosis.

Discussion
Aniridia is seen in approximately 1.8/100,000 live births. The incidence ranges from 1:40000 to 1:100000. No significant racial or gender predilection has been described. The frequency of Wilm’s tumour-in the general population is one in 10,000 to 50,000 individuals. Fraumeni and Glass found seven Wilm’s tumour patients among 28 cases of aniridia which indicates that Wilm’s tumour is more frequent in patients with aniridia than in general population. WAGR syndrome, characterized by the clinical association of Wilms’ tumors with aniridia, ambiguous genitalia, genitourinary anomalies, and mental...
retardation, which was first described by Miller et al. The underlying defect of Aniridia-Wilms’ tumour was found to be a small interstitial deletion of chromosome band 11p13. In patients with WAGR syndrome, the risk for developing a Wilms’ tumor has been estimated to be up to 45%. When associated with aniridia, a Wilms’ tumor is diagnosed before age 5 years in 80% of cases. In a study of 28 patients with non-familial bilateral aniridia Wilms’ tumor syndrome, mental retardation along with microcephaly and craniofacial dysmorphism was observed in 71%, and cataract and glaucoma in 78% of cases. Optic nerve hypoplasia resulting from inactivation of the aniridia gene Pax6, which lies telomeric of WT1 on chromosome 11p13. In our case aniridia with wilms’ tumour was associated with ocular signs of vitamin A deficiency such as bitot’s spot and conjunctival xerosis.

Therefore, renal ultrasound is recommended every 3-6 months until approximately 5 years of age. Boys are often born with genital abnormalities, such as cryptorchidism or hypospadias, but more rarely ambiguous genitalia. However, genitourinary anomalies are not always present as in our case where no genital malformation was seen. Mental retardation in WAGR ranges from borderline-to-severe. However, individuals with normal intelligence have been reported which was similarly seen our case. All the patients presenting with aniridia must be screened for wilm’s tumour.

References
Congenital Syndactyly of the Fingers: A Report of Two Cases

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Abstract
Syndactyly is defined as the failure of separation of the digits during early gestation. It is one of the most common congenital anomalies. The incidence of syndactyly is uncertain, but estimates range from 1 in 2,500 live births. During development, the fingers are webbed. This remains so, until apoptosis and skin recession allow for formation of the digital interspaces. Full inter-digital spaces are usually present by the end of the 6th week of gestation.

Here we present two patients and three hands who presented to us with syndactyly of the fingers. The first patient who was a 13 year old girl, had complete complex syndactyly between the ring and middle fingers of both hands. She underwent complete release with full thickness skin grafting in the first sitting. Six weeks later, she was reviewed and was noted to have developed scar contracture of the middle finger for which she underwent contracture release and z-plasty as a secondary procedure. In the final review at four months after the second surgery, the child was noted to have only terminal restriction of movements of the involved fingers of both hands with 'fair results' (as per the criteria of Cortez et al).

The second patient was a two years old boy, who presented to us with incomplete simple syndactyly of the ring and index finger of the left hand. He was managed with percutaneous release of the syndactyly. He was reviewed after 4 months and there was full range of movement of the involved digits. He was also noted to have 'fair results' (as per the criteria of Cortez et al).

As we had two different cases with a heterogenous presentation of two different types of syndactyly and who underwent different modalities of management, we are presenting it as an interesting case report in our article.

Key words: Webbing, reperfusion abnormality, Apert’s syndrome, congenital hand anomaly.

Introduction
Syndactyly is the second commonest congenital hand anomaly and occurs in about 1:2500 live births, more commonly in males, and is most often seen in the third web space. The condition has a strong familial tendency and is usually bilateral in presentation. It can be either primary or secondary, the former being due to a failure of differentiation or separation. Secondary syndactyly is a result of antecedent events and is produced by reconnection abnormality. Syndactyly may present as the sole abnormality or may be associated with other syndromes like Poland’s, Cleft hand or Apert’s. The anomaly can also be classified as either complete or incomplete, depending on the extent of fusion of adjacent digits. Complete syndactyly is the type where the fingers are joined from the web to the tip. Incomplete syndactyly denotes a type where the fusion of the web spaces occurs only at a point between the web and the tip. Simple syndactyly defines a subtype in which only the skin is involved while complex syndactyly involves bone, the neurovascular bundle and nail structure.

Case report
A 13 year old girl presented to us with complaints of deformity of both hands since birth. Clinical and radiological evaluation suggested a complete complex syndactyly between middle and ring finger of both hands [Figures 1(A), 1(B)]. Radiographs revealed a bony fusion between the terminal phalanges of the middle and ring fingers [Fingers 2(A), 2(B)]. A complete clinical evaluation

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showed no association with any syndrome or any underlying systemic disease.

She underwent a complete bony release with secondary skin grafting as a primary procedure. Six weeks later she was reviewed and was noted to have a scar contracture [Figure 3] with restriction of finger movements. Z-plasty was performed and scar contracture release was done as a secondary procedure. Four months after the second surgery she was reviewed and she was noted to have acceptable range of motion of all the digits and she was able to do all daily activities comfortably with ‘fair results’ as per the criteria of Cortez et al. No other complications were noted.

The second case was of a two year old male child, who presented with complaints of deformity of the left hand since birth. Clinical and radiological evaluation led us to a diagnosis of a simple type of syndactyly between the index and ring finger of left hand [Figure 4 (A), 4(B)]. Clinical assessment and detailed evaluation showed no association with any systemic illness or association with any syndrome.

He underwent a percutaneous release of the syndactyly with a zig-zag incision. He was followed up at regular intervals and during the final follow up after 4 months of surgery, he was noted to have full range of motion of the digits with an acceptable hand function [Figure 5]. He was noted to have ‘fair results’ as per the criteria of Cortez et al. No complications were noted.

Fig. 1 (A) and 1(B) : Image showing complete and complex syndactyly between the 3rd and 4th digits of both hands

Fig. 2 (A) and 2(B) : AP views of both hands showing bony fusion of terminal phalanx of both ring and middle fingers of both hands (Complex type of syndactyly).

Fig. 3 : After the primary syndactyly release of both hands. Note the flexion contracture of right middle finger at distal interphalangeal joint with malrotation in right middle and left ring finger.

Fig. 4(A) : Simple incomplete syndactyly of left hand between index and ring fingers.
Fig. 4(B) : AP, Lateral and oblique views of the left hand showing no bony fusion between index and ring fingers confirming a simple type of syndactyly.

Fig. 5 : After surgical release of syndactyly. Note the left hand is nearly similar to the digits of the right hand after release.
Discussion
Most published studies regarding the surgical reconstruction of syndactyly include heterogeneous populations of patients with simple, complex, and complicated syndactyly. Previous authors have noted that complex syndactyly has poorer outcomes with worse function, increased finger deformity, and a higher rate of revision surgery.\textsuperscript{5,6,7,8} The purpose of this investigation was to evaluate a homogeneous group of complete, complex syndactyly patients, using both objective and subjective outcome measures, in an effort to better understand the specific challenges of reconstruction.

The aim of treatment in syndactyly is to separate the fused digits, provide cutaneous cover and create a normal web space. In the past, there have been numerous techniques described for syndactyly correction. The methods have differed in respect of separation of the digits and reconstruction of the web space. It is accepted that long-term stability of the newly created web space is best achieved when the web space is reconstructed using a flap.\textsuperscript{9}

Traditional surgical approaches to syndactyly repair have used flaps from the dorsum of the involved fingers and dorsal and palmar interdigitating flaps. Surgical correction of syndactyly needs to be simple and have a minimal rate of secondary correction.\textsuperscript{10,11,12}

Current techniques use zigzag incisions along the full length of the fingers and interdigital flaps to wrap the web space. Zigzag incisions show a lower rate of digital scar contracture than straight line closure. Cutaneous flaps, which can be dorsal, palmar, or both, do bring a skin of good quality, colour, and growth into the web compared with skin grafts.\textsuperscript{10,11,12} Separated digits, however, have a greater surface area than syndactylized digits and generally skin grafts are used to cover the raw areas, with some morbidity.\textsuperscript{11}

The purpose of our study was to evaluate and study the different treatment options and types of syndactyly and their surgical outcomes.\textsuperscript{13,14}

Cortez et al; reported a series of 35 cases of syndactyly and concluded that varying degrees of surgical outcomes was noted in the simple and complex forms.\textsuperscript{4}

Lumenta et al; in his series of 26 affected web spaces who underwent surgery with palmar and dorsal skin flaps with zig-zag incisions for separation of digits. They reported a reduced incidence of web creep during their follow ups after surgery.\textsuperscript{15}

In our case we presented two different types of syndactyly managed by two different techniques and the surgical outcome of both the patients at the end of four months was excellent.

References
Additional Muscle Belly and Abberant Muscle Fibers over the Extensor Retinaculam of Wrist

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Abstract
Variations in the extensor compartment of forearm are common and are significant to neurologists, surgeons and anatomists. The present case report describes a well-developed muscle belly medial to the tendons of extensor carpi radialis longus and extensor carpi radialis brevis. Muscle belly is originating from common extensor origin on lateral epicondyle and is inserted to base of third metacarpal; bilaterally. In addition to this, aberrant muscle fibres packed in a common connective tissue bundle over the dorsal digital expansion of left hand were also found. The above observations were noted during routine dissection of a 50 year old Indian male cadaver. The variant muscle having common extensor origin and muscle fibres over dorsal digital expansion were identified and protected. The blood supply and nerve supply were noted. The clinical significance of the variation is explained in detail.

Keywords: Extensor muscles of forearm, Dorsal digital expansion, Common extensor origin, Aberrant muscle fibres.

Introduction
Variations in muscles especially presence of additional bellies and presence of tendons of existing muscles in unusual locations might misguide surgical procedures. Such muscles may stimulate soft tissue tumors or can result in nerve compressions. From an embryological perspective, the extensor muscles of the forearm extricates into three parts. The radial portion differentiates into the brachioradialis, extensor carpi radialis longus (ECRL) and extensor carpi radialis brevis (ECRB). Further separation results in a superficial and deep portion. Extensor digitorum communis, extensor carpi ulnaris and extensor digiti minimi are seen in the superficial portion. The deep portion, which is innervated by the posterior interosseus nerve, gives rise to the abductor pollicis longus and the extensor pollicis brevis on the lateral side. The extensor pollicis longus and extensor indicis on the medial side. The variations such as presence of an additional tendon or fleshy belly of extensor carpi radialis longus (ECRL) are uncommon though there are reports on the same. When a supplymentary tendon prevails, it passes either through the second compartment of the extensor retinaculum or through a separate compartment. In very subtle cases, the tendon of ECRL may split and get inserted into the fibrous flexor sheaths of the fingers. This can amend the biomechanics of wrist. The familiarity of variations in ECRL and ECRB muscles helps for improvement of efficiency in various professions. Categorization of entrapment or compressive neuropathies can be made easy for surgeons by having acquaintance of the variations. For an orthopaedician; for operating on the fractures on the lower end of the humerus such as supracondylar fractures and on the distal ends for forearm bones such as colles or smith's fractures and fractures of the wrist. Anaesthetists involved in pain executions therapeutics on the upper limb and physiotherapists carrying out electromyography for evaluating and documenting the electrical activities of the forearm muscles the awareness may be helpful for an enhanced proficiency. The clinical anatomy and morphology of the variant muscle discussed in this study.

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Case Report

During routine dissection for the first year medical students, Department of Anatomy, All India Institute of Medical Sciences, Bhubaneswar, Odisha the following variations were observed and noted. A fully developed additional muscle belly was found on the extensor compartment of the forearm, bilaterally on a approximately 50 year old male cadaver. In addition, fine granulated chips of muscle fibers packed in a separate connective tissue bundle were observed over the left side hand region over the dorsal digital expansion.

The additional muscle belly was found medial to extensor carpi radialis longus (ECRL) and extensor carpi radialis brevis (ECRB) tendons. The variant muscle was taking its origin from common extensor origin on the lateral epicondyle along with other extensor tendons. The additional muscle belly had a fleshy part and a tendinous part. The muscle was inserted to lateral side of the base of third metacarpal and was medial to the insertions of extensor pollicis longus (EPL), extensor carpi radialis longus (ECRL) and extensor carpi radialis brevis (ECRB) tendons. The morphometric analysis of the additional muscle belly was corresponding to the dimensions of the normal extensor tendons [Figure: 1,2]. The innervations and blood supply were confirmed to be the posterior interrosseous nerve and anterior interrosseous artery.

The fine fragments of muscle fibers were observed over the tendinous part of extensor digitorum, extensor pollicis longus and extensor carpi ulnaris tendons confirming their attachment to the respective tendons. Nerve supply and blood supply were posterior interrosseous nerve and anterior interrosseous artery. The muscle fibres seen over the extensor digitorum tendon were of 4cm long. The leftovers were of 1cm long and over extensor pollicis longus and extensor carpi ulnaris tendons respectively [Figure: 3].

Discussion

An anomalous muscle in the forearm extensor compartment is of academic interest. However, these muscles can create surgical complication when they outturn in to clinical manifestations symptoms or spawn hardship to discriminate it from soft tissue tumors [6].

Marked variations from the normal patterns are rarely seen in superficial group of extensors. Occasionally aberrant muscle slips are present among the superficial group of extensors of forearm [7]. An additional belly of extensor carpi radialis longus (ECRL) with a thin tendon [8] were observed in four cases; in a study of hundred limbs for variations in the forearm extensor musculature.

The accessory slip originating from the ulnar side of the ECRL which gorge from the ulnar to radial side before
insertion has also been reported [9]. Presence of an additional belly of ECRL on its ulnar side has also been reported by Chakravarthi [1]. The tendon of this crossed from the medial to lateral side superficial to the tendon of ECRL and was inserted to the second metacarpal bone. Thus among the reported variations, the presence of an additional belly on the ulnar side is more incessant compared to the one on the radial side. In the current case also there is an additional belly on the ulnar side of the ECRL.

The findings of the present study synchronizes with the above mentioned studies.

In contrast to this,
Muscular variation of the extensor compartment of the forearm is unusual and the variation in the superficial group of extensors is rarely observed [4]. Comparative anatomical studies have suggested that the superficial portion exhibits noticeable stability with the major divisions of the phyllum of the animal species, while the deep portion turn-up to be extremely volatile and has withstood considerable evolutionary changes, which is observed by eloquent variation in its expression in different species of primates [2].

The present study does not co-relate with these findings.

No comparative study was obtained for the aberrant muscle fibers packed in a common connective tissue bundle over the tendinous part of extensor muscles over dorsal aspect of hand unilaterally in the present study.

EMG studies and MRI Scan can confirm pre-operative diagnosis and to dodge superfluous intervention and complication thereof. Its presence can also be taken such as tendon transfers and reconstructive studies [10]. The tendon of ECRL is being used extensively in hand reconstructive surgeries [11, 12, 13]. Presence of additional bellies might prove to be a windfall to the patient. However a preoperative MRI scan of the forearm is obligatory to affirm the presence of such a variation. The additional tendon at the wrist might choke the spaces deep to the extensor retinaculum leading to the compression of the posterior interosseous nerve indirectly. This may consequence in deep-rooted wrist pain. The knowledge of occurrence of an additional belly may be of emphasis during injection of steroids (cortisol) in cases for tennis elbow or golfers elbow [14].

Conclusion
Although the existence of variant muscle may be asymptomatic in most cases, it is necessary for surgeons to be attentive of variations of extensor muscles. This may be included in the differential diagnosis of a soft tissue mass on the dorsum of hand. The morphometric calibrations of the supplementary muscles and their tendons will help surgeons to execute tendon transfer in the ante brachial and carpal region in a safer context.

References
Management of Scleral Thinning: An Alternate Approach

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Abstract
A 5 year old child presented with corneo-scleral tear in his left eye following trauma with knife which was repaired immediately. 1 month later there was thinning of the sclera at the sutured site. An alternate approach was proposed for the management of scleral thinning. An autologous scleral patch graft from the same eye was sutured at the area of thinning. This method was found to be more convenient and easy to perform. Since the graft was stable and the donor site was healthy; this method can be used as an alternative approach for the management of scleral thinning.

Keywords: Scleral thinning, autologous scleral patch graft, Donor sclera

Introduction
The sclera is the outer fibrous coat which provides a stable support for the intraocular contents. There are various causes for scleral thinning such as, chronic scleritis, scleral injuries following trauma or pterygium surgery, excessive use of cautery on scleral bed, over use of antimetabolites like mitomycin for pterygium and trabeculectomy surgeries, adjunctive irradiation, strabismus surgery, deep sclerotomy procedures, high myopia and systemic vasculitis.

In rare instances, it may result in staphyloma formation, scleral perforation, and uveal exposure. Therefore, reinforcement of the thin or perforated sclera is necessary to prevent prolapse of ocular contents and secondary infection.

Various surgical approaches for the management of scleral thinning are donor scleral lamellar patch graft, multilayered amniotic membrane grafting, lamellar corneal graft, rotational scleral graft and autologous scleral patch graft.

An autologous lamellar scleral patch graft from the same eye is described here. The ease of availability of a viable tissue and no risk of rejection were the major advantages. Therefore, this procedure is convenient for emergency cases as well.

Case History
A 5 year old boy presented to the Department of Ophthalmology with trauma to his left eye with knife. On examination, there was a linear full thickness corneo-scleral tear of about 4 mm in length extending about 3 mm into the sclera at the 6’o clock limbus. The corneo-scleral tear repair was done with 10-0 interrupted sutures. A partial thickness free scleral patch graft of about 3×3 mm size was fashioned from the upper temporal quadrant at the equatorial region of the sclera of the same eye after raising a fornix based conjunctival flap. The edges of the thinned out sclera at 6’o clock was freshened after raising the conjunctival flap. The scleral patch graft was carefully positioned at the area of scleral thinning and secured with 10-0 interrupted nylon sutures and was covered with the
conjunctival flap. In the same sitting, cataract extraction and in the bag PCIOL implantation was done.

1<sup>st</sup> post-operative day, the scleral patch graft was stable. (Figure 2) Patient was discharged on the 3rd day with systemic antibiotics, analgesics, oral prednisolone 20mg/day, antibiotic-steroid eye drops hourly and mydriatic eye drops thrice daily. At 1 month follow up, the scleral patch graft was well apposed and there was no signs of uveal tissue exposure. (Figure 3)

At 6 weeks, the graft uptake was good, the donor site was healthy and there was no evidence of ectasia. (Figure 4) At this point the exposed sutures were removed carefully.

**Discussion**

Scleral thinning or melt is a serious and challenging clinical problem as it threatens the integrity of the eye. Different grafts used for scleral thinning include amniotic membrane, sclera, cornea, fascia lata, cartilage, cadaveric aortic tissue, tibial periosteum and skin. Literature on autologous scleral graft from same eye is limited. However, various other techniques have been described.

Polat has described successful repair with autologous lamellar scleral patch graft for scleral melt following pterygium surgery with mitomycin C. Prydal has reported the repair of peripheral corneal perforation with autologous lamellar scleral patch graft. This procedure is beneficial in emergency cases as there is no hassle of waiting for donor tissue.

A rotational pedicle scleral graft can be done if the area of thinning is small and surrounding sclera is healthy. In our case, the surrounding sclera was unhealthy, therefore we...
did not opt for a this procedure.

Donor sclera is well-tolerated by the host with little inflammatory reaction and rare rejections and can be preserved for months. It is strong, flexible and allows a better fit to the host defects. But complications such as necrosis and melting of graft, dehiscence can be avoided by promoting epithelization and vascularization of the avascular scleral patch graft by covering with conjunctival flap or an amniotic membrane graft.

Ti et al, reported the use of corneal lamellar graft to maintain integrity of the globe in cases of scleral melting after pterygium surgery. The disadvantage was its transparency making it cosmetically unacceptable to the patient.

Amniotic membrane consists of a thick basement membrane and an avascular stroma. It has anti-inflammatory and epithelialization promoting properties. But it may not provide adequate tectonic rigidity and is amenable to rapid disintegration and loss. Hwan, Kim et al described scleral grafting with amniotic membrane for scleromalacia in cases where the adjacent conjunctiva was deficient. Rapid re-epithelialization of ocular surface was noted.

Another rare entity, surgically induced scleral necrosis (SINS), a localised autoimmune reaction occurring at a site of previous surgical wound also caused scleral thinning. It is known to occur after cataract extraction by a limbal incision, strabismus surgery, trabeculectomy and retinal detachment surgery.

The limitations of autologous scleral patch graft is the inability to take large grafts to cover large areas of scleral thinning. In cases like high myopes, where the sclera is thin overall, there is a risk of perforation while creating a graft. However, if the sclera is healthy and the area of thinning is small, an autologous lamellar scleral autograft is a safe procedure.

To the best of our knowledge, an autologous lamellar scleral patch graft with cataract extraction and PCIOL implantation in the same sitting is being reported for the first time here.

References
Fabrication of a Silicone Auricular Prosthesis – A Case Report

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Abstract
The rehabilitation of a patient with facial defects is a challenging task. An alternative to surgical reconstruction is the creation of a silicone auricular prosthesis. The replacement of anatomical parts is an art and science. These prostheses provide a cost-effective and an acceptable means of camouflage for patients who are disinclined to surgical reconstruction. The process of creating a silicone auricular prosthesis is discussed in this article.

Keywords: Ear prosthesis, Auricular prosthesis, silicone prosthesis, maxillofacial prosthesis

Introduction
Man's need for beauty has probably existed as long as man himself. Artificial replacements to replace lost body parts have been documented well even from ancient times. Body abnormalities or defects compromise appearance, a factor that renders an individual incapable of leading a relatively normal life. An alternative to surgical reconstruction is the creation of a silicone auricular prosthesis. These prostheses provide a cost-effective and cosmetically acceptable means of camouflage for patients who decline or postpone surgical reconstruction.[1]

The replacement of anatomical parts is an art and science. Prosthesis form, coloration, texture must be as indiscernible as possible from the surrounding natural tissue. The ideally constructed prosthesis must duplicate the missing facial features so precisely that the casual observer notices nothing that would draw attention to the prosthetic reconstruction.

The primary objective of maxillofacial prosthetics is to restore esthetics, function and preserve the remaining hard and soft tissues. The accomplishment of the primary objective often leads to the important secondary objective of restoring the individual to the society and enabling them to lead a normal life.

There are several advantages to silicone maxillofacial prosthesis. It requires little surgery or no surgery, the patient spends less time away from home and job and the reconstruction is often more natural-looking. However, the drawbacks include the necessity of fastening the appliance to the skin and removing it every day. The function of the prosthetic ear is to direct the sound waves into the auditory canal and to maintain a proper environment for the inner ear membranes. It normally improves hearing by about 20%. The prosthetic ear will retain eyeglasses, and retain a hearing aid if needed. It also serves as a great psychological benefit in the rehabilitation of the patient.

Steps in Fabrication

Case Report
The patient, aged 23 years, came to the Department of Prosthodontics, complaining of missing ear on the left side. On examination it was he was found to have a normal ear on right side with normal hearing. A small remnant of ear was present on left side with no auditory canal opening was
seen. The patient claimed to have hearing capacity of about 20% on the left side. The patient was diagnosed to have microtia of the left side of the ear. (Fig 1)

Treatment Plan
The entire treatment was divided into four appointments.
- Impressions
- Fabricating wax pattern
- Making the mould
- Processing the prosthesis

To make an impression, the patient’s head was tilted with the auricular area as horizontal as possible. Petroleum jelly was applied to the hair surrounding the area and the external auditory meatus was blocked with a cotton pellet. A cylindrical cardboard cover was modified as a tray to fit the patient’s right ear, and the remnant on the left side. (Fig 2) Relief holes were made in this receptacle with a no. 6 round bur. A fluid mix of alginate was made, loaded in a syringe and injected under the helix, so as to provide support for the helix when full amount of alginate is added. Remaining material was loaded and the tray was held in position against the patient’s ear. (Fig 3) Care should be taken so as not to compress the ear. A wet gauge was placed over it and dental stone poured over the set alginate, to add the support for the alginate in the tray.

The impression was inspected. There should not be any voids or bubbles on the impression. Type IV dental stone was mixed according to the manufacturer’s instruction and the impressions were poured.

Wax pattern fabrication
Once the impressions were cast, the model of normal ear will provide the necessary landmarks for defective ear around which the carving can begin. The carving detail of the ear is commenced, during which the size is constantly checked with normal ear model. Better results are obtained if the ear is carved from a mirror image of the patient’s natural ear. The projection of the ear is measured to achieve the correct distance. Using a rolled length of wax, helix is then added. (Fig 4)

Try in
The following points are checked at try in. (Fig 5)
- The fit of the prosthesis on the tissue
- The correct horizontal alignment with the natural ear.
- The projection of the ear in relation to the side of the head
- The integrity of the margins

Investment and fabrication of mould
The wax prosthesis is now sealed to the model and the leading edge is thinned as much as possible so as to allow the silicone edges to feather into the natural skin. [2]

A three part mould is necessary to achieve easy placement of silicone. Embed the mould in plaster up to the leading edge. The middle section of the flask is added and stone is filled into the entire undercut section of the mould along the part line. After a suitable separating medium is applied, the remainder of the flask is filled with stone and is closed. Also, the plaster can be soaked in soap solution which acts as a separator. The helix undercut is poured in a hard dental stone. When pouring the section, finish the plaster so that the flash line will be on the undercut side of the helix. Allow to set, and then cut grooves to allow location with the top half of the mould. Mould is again soaked in soap solution.

When the wax is boiled out of the flask, the three piece mould is left behind. (Fig 6)

Technical considerations
Cold mould seal, although an excellent method of mould separation, can present as a problem when using silicone. If it is applied too thick, it may lift away from the plaster and get trapped in the silicone.

An added problem is that it can cause the silicone to slide on the surface of the mould. In order to overcome these problems thin down the cold mould seal with water by 50 %. The dry plaster mould is then coated with it and immediately rinsed with running water. The excess is blown away using an airline. The whole mould is left to dry thoroughly.
Processing of the prosthesis
Uncolored silicon and liquid catalyst is weighed on weighing machine. This desired amount is mixed properly on a clean dry clear glass slab to avoid air entrapment Improper mixing will lead to porosity

Mixing color for facial prosthesis is a trial and error process of adding pigments in small quantities to silicone and frequently comparing the mixture to patient’s skin. The mould cavity is prepared by coating the external tissue surface area with a thin coat of catalyzed uncolored silicone material. Characterization colors are chosen and mixed with silicone polymer and painted on the surface of the clear layer. After the mould surface is characterized by localized application of color, a base color mixture of silicone material is prepared to fill the mould cavity. (Fig 7) Colored rayon fibers may be sprinkled into it to simulate microvasculature

The mould is then clamped and placed into dry heat oven at the manufacturers prescribed polymerization time and temperature.

Residual silicone may be left on the external surface of the mould to test for complete polymerization. After the polymerization cycle is complete, the mould should be allowed to cool to room temperature before removing the completed prosthesis.

Colouring Techniques
Intrinsic coloration
Intrinsic coloration is color applied within the mould during the casting procedure.

Extrinsic coloration
Extrinsic coloration is color applied to the surface of a prosthesis that has been cured and removed from the mould.

Creating a facial prosthesis that appears to have a realistic skin surface while achieving seamless visual integration with the surrounding tissue requires both artistic and technical expertise. A prosthesis that is too light in value can be corrected with intrinsic coloration; however, a prosthesis that appears too dark in value is difficult to remedy and most often needs to be reprocessed.

Extrinsic coloring is necessary to disguise the appearance of a seam along the helix and to blend the anterior margin to the surrounding tissues. However the application of the extrinsic glazes often results in a glossy appearance that many appear unnatural and draw unwanted attention to the prosthesis

Lighting considerations
If color corrected lighting is not available, incandescent with ample natural light may be used. A color match is best evaluated under various light sources such as day light, fluorescent and incandescent to reduce metamerism.

Identifying and mixing the base color
The base color makes up the bulk of the prosthesis; therefore, mix ample material to fill the mould. Considering that the skin is laminar, the objective is to mix the color of the underlying skin tone. One of the most common approaches to mixing color for facial prosthesis is a trial and error process of adding pigments in small quantities to silicone and frequently comparing the mixture to patient’s skin in adequately lit environment.

Common places to identify the base color are on the underside of the fore arm, along the hairline, anterior to the tragus, and at base of the helix. (Fig 8)

For repeatability, pigments amount added should be measured and recorded by weight or dropper. When the color of the silicone approaches the desired base color, place a small amount of colored silicone in the center of a folded transparent sheet. Compare the mixed silicone color with the target base color of the patient’s skin and modify as necessary.

Surface characterization
Incorporation of surface characterization is important in creating lifelike results. Freckles, moles, broken capillaries, prominent blood vessels and other skin markings on the contra lateral ear can be used to characterize the prosthesis.
Fig. 1: Clinical presentation

Fig. 2: Cardboard tray

Fig. 3: Impression

Fig. 4: Wax up

Fig. 5: Trial

Fig. 6: Three piece mould

Fig 7: Packing of silicone

Fig 8: Shade matching

Fig 9: Adhesive

Fig. 10: Fit of prosthesis
Skin adhesives
A variety of adhesive systems have been employed to retain facial prosthesis in position. They are mainly classified by the method in which they are dispensed: pastes, liquid, emulsions, spray, and double sided tapes. Most facial prostheses are retained with medical grade adhesives.

Fit of prosthesis
When the desired intrinsic shade of a skin was obtained, the auricular prosthesis was tried in patient to check for accuracy of shade and color of the skin on contra lateral side of the face. Once the desired skin shade was obtained, the extrinsic stains (Cosmosil) were painted on prosthesis to match the skin shade on contra lateral side of the face. (Fig 9) Dry air was blown over the prosthesis with the help of a dry air syringe to cure the extrinsic stain. The prosthesis was tried in. Few adjustments and minor modifications were done for better retention and marginal adaptation of the prosthesis. The patient was informed about the limitation and retention aspect of the prosthesis.

Satisfactory retention and stability was achieved by using skin adhesive (Beta Bond, Medical Graded Adhesives) and anatomical and soft tissue undercuts. (Fig 10)

The patient was instructed to apply the skin adhesive over the defect area and leave it over for 2 minutes, so that the adhesive becomes more transparent and then to place the auricular prosthesis over the defect. The frame of the eyeglass can be used to gain additional retention and stability.

The patient was instructed about the use and follow up care of the ear prosthesis.

Discussion
There are two main reasons for auricular defects – Congenital and Acquired.

Congenital involves abnormalities of the first and second branchial arches. Congenital anomalies manifests as microtia or anotia. In microtia, there is atresia of external auditory meatus and the remnant is ‘comma’ shaped with upper portion containing a small nubbin of deformed cartilage. Anotia is complete absence of the auricle and is completely rare. Congenital anomalies occur in concurrence with syndromes such as Treacher Collins syndrome and Goldenhaar’s syndrome.[3]

Acquired causes could be trauma, burns or malignancies. The more common malignancies include squamous cell carcinoma, basal cell carcinoma and malignant melanoma. The most specific and recommended treatment modality for large tumours and malignancies in the head and neck region is by surgical excision, with or without chemotherapy. After surgical removal, it has to be restored with silicone prosthesis. Hence the Prosthodontist plays major role in fabricating and rehabilitating such large defects on face, occurred by performing radical maxillofacial oncosurgery

Surgical reconstruction versus prosthetic restoration
The choice between surgical and prosthetic rehabilitation of large defects is a complex decision depending on size and etiology of the defect as well as on wishes of the patient. Basis of major ear reconstruction is the fabrication of a framework from rib cartilage held with stainless steel wire and buried under thin skin. The construction of facial prostheses consists of four stages, each equally important to the success of rehabilitation effort and each requiring extraordinary attention in detail and is a challenge. [4]

Difficulties
The difficulties faced during fabrication of custom made prosthesis are; obtaining accurate impression of the defect without any compression or distortion of tissue, orientation of ear in harmony with the contra lateral ear, sculpturing the exact anatomy and position of the prosthesis, obtaining a satisfactory shade exactly matching to the skin complexion of contra lateral side of the face.

The location of the prosthetic auricle is predetermined by first observing the topographic relationship of opposite normal ear with facial features in cases of unilateral prosthetic reconstruction and then duplicating its position at the proposed reconstruction site. According to Tolleth,
three measurements must be correct to achieve a proper placement of the auricle; AXIS, LEVEL and DISTANCE from the orbit. [5]

Axis: It is difficult to define exactly the positioning of the axis, but it can be described as the "line of balance" through the long dimension of the ear. Some indicate that axis is parallel to the bridge of nose. An angulation of 20 degree from vertical position seems to be satisfactory.

Level: The level can be assessed with the head in the anatomic vertical position. The highest part of the helix is on a line roughly with that of the eyebrow, and the lowest part of the lobule is on a line at the base of columella or slightly below that.

Distance from the orbit: The ideal distance of the prosthesis from the lateral orbital rim is about one ear length, or 6.5 to 7.5 cm.

Retention of the prosthesis
The retention and stability of the prosthesis is an important factor for the prosthesis; hence the ear prosthesis can be retained by various methods of retention, either by using anatomical undercuts, hair bands, and frame of eyeglasses, adhesives and implants with magnets or bars.[6]

Although implants can provide better retention and stability of the prosthesis, the reported drawback of implants was high number of failure rates due to the effect of radiation therapy on bone morphology, the compromised healing of the skin in the region of the mastoid and accuracy of impression over movable tissues. [7] In addition, cost factor of the implants and the waiting period was not acceptable by the patient.

Another major disadvantage was that due to psychological trauma of undergoing oncosurgery, the patient hardly agrees to undergo another surgery for

Implant placement. Thus, due to these factors clinicians had no better option rather than using custom made prosthesis for such patients. [8]

The skin adhesive may degrade and results in reduced strength and bonding property over a long period of time; some skin adhesives have been reported to cause hypersensitive reactions. [8] Although the success rate of implant supported

Prosthesis is very high, the prosthesis retained with skin adhesives, anatomical and soft tissue undercuts are more successful due to their ease of application and are comparatively less expensive then implant supported prosthesis.[9]

Silicone elastomeric materials are more commonly used, because they provide better stability and good marginal adaptation, which satisfies patient's cosmetic and esthetic needs; but the major disadvantage is that the manipulation of silicone requires more complex, advanced and multifaceted techniques which are rather more expensive.[10] The silicone elastomeric material possess' excellent physical properties with good heat stability and are chemically inert materials, particularly when they are used in fabrication of prosthesis used to restore body parts.

Silicon elastomeric material possesses soft tissue like consistency; provide additional advantage when they are used to restore the defects in movable soft tissues. Silicon materials are available in various shades provided by manufacturers to give exact shade and texture of skin which closely simulate and resemble shade of patient's skin complexion. The drawback of the silicon prosthesis is that, in the long term the prosthesis material degrades easily and its additives undergo changes when exposed to moisture, high temperature, UV light and sunlight, thus creating a need for replacement by a new prosthesis. To overcome these disadvantages newer polymeric materials have been introduced like polyphosphozenes, silicon block polymers, methacryloxypropyl terminated polydimethylsiloxane with enhanced mechanical, chemical and physical properties, such as increased elongation, high edge strength, improved heat stability, good tear strength, chemically inert, low hardness and viscosity for fabrication of maxillofacial prostheses. [8]

In our current case, the ear prosthesis was replicated well
and bore good resemblance to the patient’s right side ear from the frontal and rear views. The colour matching with intrinsic shades were a close match but they were improved with help of extrinsic stains. The prosthesis was fitted with the help of medical grade adhesive and the anatomical undercuts available from the remnants of the auricle on the left side. The patient was hesitant to wear spectacles for the retention of the prosthesis. The anterior margins were strategically hidden by the hairline while the posterior borders merged well in shade to the skin. Overall, the patient expressed complete satisfaction in the auricular prosthesis.

**Conclusion**

Difficulties encountered during the reconstructive process. It is difficult to simulate the exact anatomy of the contralateral side. But the smile on the patient face after the reconstruction gives satisfaction and encouragement to help people live better with the little services that we can provide.

**References**

Low-grade endometrial stromal sarcoma (LGESS), also known as endolymphatic stromal myolysis, is a rare tumor, accounting for just 0.2% of malignant uterine tumors and approximately 10% to 30% of uterine sarcomas (1-3). They resemble endometrial stromal cells in the proliferative stage. The annual incidence of endometrial stromal sarcoma (ESS) is 1-2 per million women. Compared to other uterine malignancies, ESS affects younger women and the mean age is 42-58 years (4).

Based on the mitotic state, ESS is histologically divided into two groups: high grade (HG) and low grade (LG) (5). HGESS is currently defined as an undifferentiated endometrial sarcoma (UES) characterized by more than 10 mitosis per 10 high power fields (HPFs). Additionally, this sarcoma is more aggressive and has a poor prognosis. In contrast, LGESS has fewer than 10 mitosis per 10 HPFs, and the cell nuclei are not atypical or pleomorphic (5). LGESS is relatively more common and tends to occur before menopause. LGESS exhibits a more indolent course, but has high relapse potential (6). These two entities should be treated differently.

For LGESS, hysterectomy is the cornerstone of treatment, however, the role of a bilateral salpingo-oophorectomy (BSO), as well as lymphadenectomy for complete surgical staging, is debated. Adjuvant treatment including hormonal treatment, chemotherapy and radiotherapy (7).

Recently a specific translocation t(7;17) (p15; q21) with involvement of two zinc finger genes juxtaposed with...
another zinc finger protein 1 and joint juxtaposed with another zinc finger protein 1 was described in most of the ESS(8). There is relation between chromosomal aberrations and endometrial sarcomas. Chromosomal deletion on 7p was the most common finding(55.6%) in ESS and may play a role in tumor development and progression(9).

Case Report
A 42 years old female (para3 living3) was admitted to our hospital with complaints of menorrhagia and mild lower abdominal pain for the last 2 years. Her menstrual cycles had been normal six months back when she developed menorrhagia. She had periods at an interval of twenty five days and bleeding lasting for eight to ten days. Flow was excessive with history of passage of clots.

She was not using any contraception. There was neither history of exogenous hormone use nor history of drug intake like tamoxifen.

Physical examination showed the patient was moderately built and nourished with severe pallor. The rest of the general and systemic examination was normal. Her haemoglobin was 7 gm%.

On abdominal examination there was suprapubic mass corresponding to twenty eight weeks size uterus. On per speculum examination cervix was healthy. On pervaginal examination uterus was uniformly enlarged to twenty eight weeks size, soft to hard in consistency and mobile. Bilateral fornices were free.

Ultrasound showed grossly enlarged uterus >25 X 10 X 15cm and multiple hypoechoic masses largest measuring 12cm in the uterus suggestive of fibroids. Our clinical diagnosis was fibroid uterus with cystic degenerative changes. Prior to surgery she was transfused with two units of blood. Total abdominal hysterectomy and bilateral salpingo-oophorectomy was performed.

Intraoperative uterus was enlarged to twenty eight weeks size with irregular surface and soft in consistency, with cervix. Bilateral ovaries were normal. Cut section of the uterus showed a mass 10X12cm a large partially circumscribed grey white tumor obliterating the endometrial cavity with fluid filled cystic spaces histopathological examination of the specimen showed low grade endometrial stromal sarcoma.

The histopathological diagnosis of LGESS was conferred for appropriate treatment. Immunohistochemical stains were not done in our case because of economic limitations. Postoperative period was uneventful. She received adjuvent pelvic radiotherapy(2DRT)with 50Gy for 25 days.

Discussion
Uterine sarcomas are rare tumours of mesoderaml origin. They constitute 2 to 6% of uterine malignancies. Of these, endometrial stromal sarcomas are very rare.

They are divided into three types depending upon mitotic activity, vascular invasion and observed differences in prognosis.

1. Endometrial stromal nodule(ESN)
2. Low grade endometrial stromal sarcoma(ESS) and
3. High grade or undifferentiated endometrial stromal sarcoma(UES)(10)

Boardman et al. differentiated low grade ESS by cellular uniformity, less frequent mitosis(<3/10 HPF versus >10/HPF), and lack of haemorrhage and necrosis(11).

Uterine sarcomas usually affect post-menopausal females. Women with LGESS are younger with a median age being 45 and 57 years. Symptoms at presentation include abnormal vaginal bleeding, menorrhagia and abdominal pain(12). The tumours have an indolent growth with a tendency for late recurrence(13). Metastasis are rarely detected before the diagnosis of the primary lesion.(14).

Grossly, low grade ESSs involve the endometrium, occasionally extensively. By definition tumours are infiltrative. Rarely, the tumours manifest as polyps, usually with haemorrhage and infarction. Because of its
prominent intravascular growth a soft tan to yellow cut surface and appear as cords and nodules infiltrating through the uterine smooth muscle.

The histologic features recapitulate the gross appearance with cords of tumour cells infiltrating between smooth muscle and within lymphatic spaces. The neoplastic stromal cells resemble those of the proliferating endometrium, are monotonous in appearance, and have relatively uniform size and shape(14). Tumour cell nuclei are round to ovoid and have fine chromatin, and small, inconspicuous nucleoli may be seen. A small amount of cytoplasm is present, and cell borders are indistinct. Mitotic activity is usually low (<10/10 HPF). It should be noted that rare causes of low-grade ESS will have a greater number of mitotic figures, although this is not associated with an adverse prognosis(15). Proliferating small vessels resembling the endometrial spiral arterioles are characteristic, and tumours can have bands of hyaline connective tissue separating islands and clusters of bland neoplastic stromal cells(16).

The differential diagnosis of LGESS includes ESN, cellular leiomyoma, cellular intravenous leiomyomatosis, cellular endometrial polyp and various soft tissue neoplasms(17)

Surgery is the final resort for primary treatment of LGESS consisting of total abdominal hysterectomy with bilateral salpingo-oophorectomy. Regardless of patient’s age, preservation of ovarian tissue because of likelihood of ovarian metastasis. In addition, since ESS has steroid receptors the possibility exists that estrogen production by retained ovaries may stimulate any residual disease., oophorectomy is recommended. Due to high recurrence risk even with localized tumours. Many clinicians advocate use of adjuvant chemotherapy, radiation therapy and/or hormonal therapy to suppress tumour growth.

Hormone therapy with medroxy-progesterone, tamoxifen, gonadotropin releasing hormone analogues(GnRH) and aromatase inhibitors are suggested for LGESS and for recurrent disease(18). Uterine sarcomas have a poorer prognosis and survival is much worse than that reported for endometrial adenocarcinoma, with an overall survival of less than 50% at 2 years, even when presenting at an early stage. A higher survival is reported with LGESS as compared to other uterine sarcoma(19, 20).

Conclusion
LGESS is a rare malignant tumor, presenting as abnormal uterine bleeding in perimenopausal women. The usual pre-operative diagnosis is uterine leiomyoma and definitive diagnosis is achieved only after histopathology of uterus. By reporting our case, we wish to stress the necessity for a high grade suspicion to diagnose this tumor even in younger women. A prompt diagnosis and timely intervention are keys to improve patient survival.

References


Laparoscopic Marsupialization of a Giant Non-Parasitic Splenic Cyst (NPsc) in the Paediatric Age Group

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Abstract
Nonparasitic splenic cysts are rare clinical lesions of the spleen. The management has entailed partial or total splenectomy via an open approach. Recently, laparoscopic approaches have been developed. In this report, we describe laparoscopic marsupialization of a giant splenic cyst (diameter > 15 cm). A 15-year-old Indian child presented with a four and a half year history of mass in upper left quadrant associated with left upper quadrant pain which increased since 2 days. Physical examination revealed a large, non-tender left upper quadrant mass with minimal movement on respiration. Computed tomography scan confirmed a cyst arising from the spleen, measuring 20 x 15 cm suggestive of a primary splenic cyst. Echinococcus and Entamoeba histolytica serologies were negative. Laparoscopic exploration was performed. Three liters of brown fluid were aspirated and intraoperative cytology confirmed a nonparasitic cyst. The cyst wall was excised, preserving the spleen. The patient’s recovery was uneventful, and he was discharged, tolerating a regular diet on postoperative day 3. At follow-up, the patient was asymptomatic and showed no evidence of recurrence. Non-parasitic splenic cysts are rare lesions. Laparoscopic marsupialization is safe and effective and should be considered the treatment of choice even for giant splenic cyst.

Key words: laparoscopic, marsupialization, giant splenic cyst

Introduction
Splenic cysts are rare lesions and should be suspected when a mass is noted in the left upper quadrant [1]. The traditional classification divides them into true cysts (primary) and pseudo cysts (secondary) on the basis of presence or absence of an epithelial lining. [1] Primary cysts can be divided into those with parasitic and those with non-parasitic causes. Secondary cysts are usually seen following abdominal trauma and are thought to be a late complication of an intrasplenic haematoma, such cysts may become quite large and cysts greater than 15 cms are considered as giant cysts. [1] Formerly the treatment of choice for splenic cysts consisted of total splenectomy via an open approach but however due to a small but real risk of overwhelming post splenectomy sepsis (OPSI), spleen sparing techniques have been developed, additionally advances in minimally invasive surgery have resulted in effective treatment with less morbidity. Although laparoscopic hemi-splenectomy has been reported, most non-parasitic splenic cysts (NPSC) may be unroofed or marsupialized with good results. In this paper, we present a giant splenic cyst which was successfully treated by laparoscopic marsupialization [1].

Case Report
A 15 year old child presented with a mass in the upper abdomen which was insidious in onset and gradually progressed to its present size over 4 and half years associated with a dull aching type of pain in the left upper quadrant of the abdomen which increased since 2 days. Physical examination revealed a large, firm mass measured 20 X 15 cm in the left upper quadrant, the rest of the physical examination was unremarkable. An ultrasound abdomen showed a 20 X 15 cm cystic lesion arising from the spleen. The computed tomography (CT) scan of the abdomen confirmed a large
20X15 cm cystic lesion arising from the spleen exerting a significant mass effect on the surrounding organs, the stomach, duodenum and pancreas were displaced medially and the left kidney was compressed posteriorly [Fig 1 and 2]. Because of the symptoms and size of the cyst, surgery was recommended and the patient agreed to proceed. After induction of general anaesthesia, the patient was placed in the supine position, after establishing pneumoperitoneum, a 10mm 30° laparoscope was inserted through a right iliac fossa port, the abdomen was explored and a giant splenic cyst was identified [Fig 3]. The mass displaced the transverse colon inferiorly and the stomach and duodenum medially. Two additional 5mm trocars were placed in the right lumbar and left lower abdominal quadrants. After delineating the cyst wall all around, three litres of fluid were removed before the cyst was completely decompressed. Intra-operative fluid serologies were negative for *Echinococcus* and *Entamoeba histolytica*. The cyst was then widely unroofed by excising the entire posterior and lateral wall [Fig 4]. After deroofing, the trabecular cyst lining was visualized and debris was removed, thus complete marsupialization was achieved [Fig 5]. The cyst wall was placed in a specimen bag and relieved through the 10 mm port site [Fig 6]. Post-operative period was uneventful. Histopathology was suggestive of a primary epithelial cyst of the spleen.

Fig. 1a and b: Computed tomography (CT) showing a large 20X15 cm cystic lesion arising from the spleen exerting a significant mass effect on the surrounding organs, stomach, duodenum and pancreas were displaced medially and the left kidney was compressed posteriorly.

Fig. 2: Laparoscopic view of the giant splenic cyst.

Fig. 3: Laparoscopic view of the decompressed splenic cyst.

Fig. 4: Laparoscopic view of the cystic cavity and debris.

Fig. 5: Laparoscopic view of the cyst wall was placed in a specimen bag.
Discussion

In 1790, Berthelot described the first echinococcal splenic cyst and in 1829 and Andral described the first NPSC [1], since then approximately 800 cases of NPSC have been reported and a recent increase has occurred in the incidence of post traumatic cyst.[2]. Several classifications for splenic cysts exist, the most widely adopted is that of McClure and Altemeier which divides splenic cysts into two groups. A specific secreting membrane lines primary or true cyst, the lining may be epithelial, endothelial or parasitic. Echinococcus is the most common parasitic cause and most of the other primary cysts are congenital. False or secondary cysts do not have a secretory lining and may be serous, inflammatory, degenerative or haemorrhagic. Blunt abdominal trauma with occult injury to the spleen is the most common cause for secondary cyst [3]. Patients with a suspected splenic cyst may have a palpable mass on physical examination, but often do not. Other causes of splenomegaly including myeloid metaplasia, haemolytic anaemia, mononucleosis and portal hypertension must be excluded [4]. Ultrasound and CT imaging may help to distinguish cystic from solid lesion and to characterize cyst loculations [5]. Although the natural history of secondary splenic cysts is not completely known, a risk of rupture, infection or haemorrhage. Asymptomatic patients with small cysts (<5 cms) may be observed and usually do not require treatment. For symptomatic patients and for large cysts (>5 cms), surgical treatment is indicated. Historically, the treatment of choice for NPSCs has been total splenectomy. Although splenectomy may be indicated for patients with patients with parasitic cysts, spleen sparing techniques have evolved as the treatment of choice for NPSCs so that the risk of OPSI may be avoided [1]. The incidence of OPSI is 3.3% to 4.4% among children and 0.9% to 3.2% in adults with mortality ranging from 0.8 to 4.4% [1]. The organism most frequently associated with OPSI are Streptococcus pneumoniae, Neisseria meningitides, Escherichia coli and Haemophilus influenza. Spleen sparing techniques such as percutaneous drainage with or without injection of a sclerosing agent have been described but results in a high rate of recurrence [1]. On the other hand, partial splenectomy and marsupialization via an open approach has been proven effective [1]. Laparoscopic approaches for both techniques have recently proven feasible and result in less operative morbidity. In our patient, a partial splenectomy was unnecessary because the cyst was broad-based and amenable for unroofing. For deeply seated, narrow based cysts, a hemisplenectomy may be indicated to prevent recurrence.

Conclusion

Non parasitic splenic cysts are rare lesions but may be associated with significant symptoms. Laparoscopic marsupialization is safe and effective and feasible for giant splenic cysts, a laparoscopic spleen sparing technique should be considered the treatment of choice.

References

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