PAKISTAN JOURNAL OF PUBLIC HEALTH

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SUBSCRIPTION FEES

Pakistan: Annual PK Rs. 2,000
Single copy PK Rs.500
Overseas: Annual USD 300
Single copy USD 80

Indexed at
PakMediNet
www.pakmedinet.com
WHO Index Medicus for the Eastern Mediterranean Region
Pakistan Journal of Public Health 2013
Health Services Academy, Islamabad
ISSN: 2225-0891
E-ISSN: 2226-7018
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The Pakistan Journal of Public Health is a peer reviewed national journal published quarterly by the Health Services Academy, Islamabad, Pakistan. It will soon be abstracted/indexed both nationally and internationally. The Pak J Public Health is an open access journal which will benefit all those working in the field of public health in Pakistan.

Scope of the Journal
The Pak J Public Health accepts articles from both national and international contributors with a special emphasis on research that will have a direct impact on the practice of public health in Pakistan and around the world. The types of articles accepted include original articles, review articles and short communications. Special features will include opinion pieces, letters to the editor, education forum and students corner.

Editorial Process
The Pak J Public Health will only publish articles that have not appeared anywhere else. The review process will entail an initial review for short listing articles on the basis of relevance to public health issues, meeting minimum technical/scientific standards, having a significant public health message. Articles passing the initial short listing process will be subjected to a double blind review by at least 2 reviewers of renowned status in public health field, nationally and internationally. They will assess the articles on the basis of objectives, methodology, scientific rigor and conclusions drawn. Any queries generated during this process will be forwarded to the author/s for correction or revision by the journal editor/s.
When all outstanding issues in the article have been addressed/ corrected, the final document will be subjected to a light edit for grammar, punctuation and language. The authors will be given up to a week to approve the final document for printing.

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Authorship of the articles can be claimed by those researchers who have made a major contribution in the study. Acceptable contribution would include, design & concept of study, data gathering, interpretation & analysis, article writing, proofing and/or corrections. Authors would also be expected to declare any possible conflicts of interest as well as the degree of contribution to the above mentioned criteria by each of the authors of the study. The sequence of authors once submitted will not be changed without the express consent of all authors. Furthermore, the number of authors for each study should reflect the scope of work. National level, multi site studies or those having multiple collaborating partners could have more authors than ones dealing with limited scope.

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The manuscripts should be prepared in accordance with the ICMJE guidelines for manuscript submission. Before submitting a manuscript, contributors are requested to check for the latest instructions available. http://www.icmje.org/urm_full.pdf
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1. Original research
   Abstract
   Abstracts of original research article should be prepared with a structured format i.e. Introduction/background, objectives, methods, results and discussion/conclusion. Authors must include 4-6 key words. Review article, Case report and other require a short, unstructured abstract. Commentaries do not require abstract. Abstract should not exceed the word limit of 300 words for original articles and the total word count not more than 3000 words, excluding the abstract and references.

   Introduction
   This section should include the purpose of the article. The rationale for the study or observation should be summarized; only strictly pertinent references should be cited; the subject should not be extensively reviewed. Data or conclusions from the work being reported should not be presented.

   Methods
   This section must include the type of study, study population, study area, study duration, details of developing tools for data collection, pre-testing, data collection, plan of analysis, ethical considerations and any other detail deemed necessary to be submitted to support the researchers’ work. References to established methods should be given, including statistical methods; references and brief descriptions for methods that have been published but are not well known should be
provided; new or substantially modified methods should be described, giving reasons for using them, and evaluating their limitations.

Results
These should be presented in a logical sequence in the text, tables, and illustrations. All the data in the tables or illustrations should not be repeated in the text; only important observations should be emphasized or summarized.

Tables and figures
Tables and figures should be kept to a minimum. Tables must be comprehensible without reference to the text. References should not be cited in the tables. Authors should indicate at approximately what point in the text the table should appear. Figures, graphs, drawings etc. should not be over complex and must be intelligible when reduced in size for printing. They should be on separate sheets, numbered and with legends. Number tables consecutively in accordance with their appearance in the text. Place footnotes to tables below the table body and indicate them with superscript lowercase letters. Avoid vertical rules. Be sparing in the use of tables and ensure that the data presented in tables do not duplicate results described elsewhere in the article.

Discussion
The author's comment on the results, supported with contemporary references, including arguments and analysis of identical work done by other workers. A summary is not required.

2. Review
A comprehensive, evidence-based review of the literature relating to an important, major public health area, with a critical analysis and conclusions. The literature review methodology, including databases searched, search terms and dates, should be detailed. Reviews should normally not exceed 4000 words and should include up to three key message points.

Reviews can be submitted on
- Public health practice and impact
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- Health promotion and disease prevention
- Critique on public health programs or interventions
- Public health governance, audit and quality
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- Capacity in public health systems and workforce
- Social determinants of health

This is not an exhaustive list and the Editors will consider articles on any issue relating to public health.

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Manuscripts for publication as Short Reports should be of an overall maximum length of 2000 words, including summary and references. This is equivalent to approximately four printed pages of the Journal. If Tables and/or Figures are included (maximum of one page), the text should be limited to 1500 words. The report should have a short summary, followed by a single text section that is not divided into introduction, results and discussion sections etc. (as in full papers). These should be submitted to the Journal in the same way as full papers (see Submissions).

4. Letter To The Editor
Letters to the editor and replies should offer objective and constructive criticism of published articles. Letters may also discuss matters of general interest to readers of Pak J Public Health and the public health community. Material being submitted or published elsewhere should not be duplicated in letters, and authors must disclose financial associations or other possible conflicts of interest. Letters should not be of more than 500 words and 5 references.

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Welcome to the volume three, third issue of the Pakistan Journal of public Health. It is gratifying to note that a large number of new articles, on a wide variety of topics related to public health, are being submitted for publication in this journal. As a matter of policy the journal encourages both fresh graduates as well experienced medical and bio-medical scientists to publish their work.

The PJPH continues to highlight the diversity of public health issue specially those which have direct impact on quality of life of people. The significance of quality of life in health can be ascertained from the WHO definition of Health that was included in the preamble to Constitution of the World Health Organization adopted in 1946 as “health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”. It is important to pay attention to the psycho-social aspects of health to ensure complete wellness and quality of life.

This issue includes articles on psycho-social determinants of health One paper explores the impact of divorce on psycho-social determinants of sound health. A paper on prevent ion of wasting in children of under five years age points out the significance of prolonged breast feeding and availability of better health care facilities. Another article relates the tuberculosis problems, to a number of serious weaknesses in awareness, education, income and inability of people. It also points out to the inadequacies at health care systems, such as non-supportive behavior and lack of communication skills of professional health care providers, as well as financial and technical inadequacies of health facilities that result in serious consequences of non-compliance to the Anti-tuberculosis Treatment Therapy A paper on unhygienic conditions among student community points out to the lack of appropriate washing facilities in hostels as one of the main Factors responsible. An article reviews the issue of brain drain of health workers and recommends improvement in health systems incentive package for health workers to retain them in the country. A point survey deals with the important issue of insecticide resistance development and the control of vector-borne diseases the country.

We wish to thank our contributors and readers for their overwhelming response and support to JPJH and as reported earlier, the Pakistan Journal of Public Health has obtained the indexation in WHO EMRO database of Scientific journals (IMEMR), Index Copernicus and EMBASE, it is in progress with Thomas Reuters, Pakistan Medical and Dental council and Higher Education Commission of Pakistan.

We wish to acknowledge our gratitude, for the members of editorial board and reviewers for ensuring the quality of publications and national and international members of Advisory Board for support and advice for continued improvement of the Journal.
Prolonged breast-feeding prevents wasting in children: A community-based study from rural Sindh, Pakistan

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Abstract

Purpose: Wasting is an important indicator of child's health and is represented by low weight for child's length or height. According to UNICEF, an estimated 26 million children suffer from wasting in developing countries. Child malnutrition including wasting is a recognized public health problem in Pakistan. The study was conducted to determine the prevalence of wasting and its associated risk factors among children under-five years of age in a rural town in Pakistan.

Method: Using a cross-sectional design, a total of 800 children under-five years of age were enrolled in Jhangara town, located in a district in rural Sindh, Pakistan. Anthropometric measurements were performed on the children. A child was defined as suffering from wasting if the Z score was less than a value of 2 SD below the reference median. Information on breast-feeding history, history of infections, birth weight and area of residence was collected. Multivariate analysis was done using the multiple logistic regression model.

Results: Of 800 children, boys were in the majority (56.3%), while 43.8% were girls. The mean (± SD) age of the boys was 25.34 ±16.48 months, while the mean (± SD) age of the girls was 25.75 ± 15.90 months. The majority (92.3%) of the children were breast-fed, with a mean (± SD) duration of 15.05 ± 7.90 months. Prolonged breast-feeding (>12 months) was seen to have had a protective effect against wasting. The children who were breast-fed for longer than 12 months were 0.6 times less likely to suffer from wasting compared to those who were breast-fed up to 12 months (OR = 0.6, 95% CI 0.43–0.98). Furthermore, the area of residence played a significant role in child's wasting. Children living outside the Jhangara town were 1.8 times more likely to have wasting compared to those living inside the town (OR = 1.8, 95% CI 1.17–2.69).

Conclusion: This study provided strong evidence to support current infant-feeding recommendations by WHO for optimum child growth and development and to prevent the risk of wasting among children under-five years of age. The high prevalence of wasting among children living outside the Jhangra town reflected the possible role of the health care facility located within the town and its possible role in contributing to lower prevalence of wasting. Efforts are needed to provide appropriate breast-feeding education, improvement in social determinants of health, and to design and test the efficacy of nutritional interventions for reducing the prevalence of wasting among children under-five years of age.

Key words:
Wasting; children under-five; breastfeeding; malnutrition (Pak J Public Health 2013; 3(3): 2-8)

Introduction

Proper nutrition and balanced diet remains one of the pivotal elements for the optimal functioning in all stages of one's life(1). It provides an adequate supply of required nutrients for the optimal growth and development, thereby strengthening the body's immune system to resist infections (2). Malnutrition is gaining particular interest worldwide and more specifically in low income countries (LICs) with substantial contribution to disease burden among children under-five year of age (3-5). Malnutrition represents the deficiency in vitamins or minerals or an excess in a person's intake of nutrients and other dietary elements(6).

Malnutrition can be assessed through anthropometric indices (7). First is weight for age (underweight), it represents a convenient synthesis of both linear growth and body proportion; second is weight for height/length (wasting), it is indicated by a low weight for height ratio and is particularly sensitive to acute growth disturbance; third is height for age (stunting); depicts performance in terms of linear growth and represents long term growth flattering health (7). The
consideration for wasting and stunting is cited as the more useful consideration for estimating the underweight status of children under-five years of age (3).

A report by UNICEF published in 2008 states that poor nutrition contributes to half of the 7.6 million child deaths each year (8). Children who suffer from wasting (severe acute malnutrition) contributes a major proportion of child deaths (9). According to UNICEF, 13 percent of children under-five year of age in the developing world are wasted and 5 percent are extremely wasted (estimated 26 million children) (10). South-central Asia is estimated to have the highest prevalence (16%) of wasting with an estimated 29 million children under-five years of age (3). In India, 20% of children under-five years of age suffer from wasting due to acute under-nutrition (11). Childhood malnutrition including wasting results from complex interplay of multidimensional factors. Poverty, illiteracy, low maternal education (12, 13), micronutrient deficiency (3), sub-optimum breastfeeding practices (3) children of younger mother (14) increase number of siblings (12) and unskilled laborers (12) have found to be significantly associated with child under-nutrition (13). Malnourished children are more susceptible to infections which impair their quality of life. Common childhood diseases such as diarrhea (15) and respiratory tract infections are more common in malnourished children which traps them in vicious cycle of recurring sickness, flatterting growth and diminished learning ability (16). Among all the factors cited earlier, incorrect infant feeding practices significantly predispose child toward malnutrition (17, 18). It is universally accepted that breastfeeding positively influence child’s health and improved nutritional status (19, 20). Inappropriate breastfeeding practices have also been found to be documented among the mothers of mildly wasted children (21). Therefore, among the various interventions toward promoting adequate child growth and development, prolonged breastfeeding is one of the vital interventions which have been found to be significantly associated with reducing or preventing child malnutrition (21, 22).

Pakistan is among the developing countries in the world, with child malnutrition being recognized as a major public health problem since a decade; this also contributes to country’s high child morbidity and mortality rates (23). Pakistan National Nutritional Survey (NNS) 2011 indicates that among children under-five, about 43.7% were stunted in 2011 as compared to 41.6% in the 2001, 15.1% were wasted in 2011 as compared to 14.3% in 2001 and 31.5% were underweight, which has not changed since 2001 (24). Therefore, looking at the current progress, it seems unlikely to achieve MDG 4, because malnutrition is the major contributor of increase child’s morbidities and mortalities around the world (8-9).

In many developing countries, majority of the children who suffer from severe acute malnutrition i.e., wasting are never brought to health facilities (24) and they ultimately become the victim of infectious diseases which results in adverse health consequences. Proper interventions at community and at household levels can only be designed once the burden of malnourished children is examined. Therefore, the objective of this study was to determine the prevalence of wasting and its associated risk factors among children under-five years of age in a rural slum town of Sindh province, Pakistan.

Methods
Using the cross sectional design, a survey was carried out in Jhangara town located in district Dadu in rural Sindh, Pakistan, which is 15 km away from Sehwan Sharif and 320 km from Karachi. Majority of the population is illiterate; the area is inhabited by Sindhi speaking Muslims, most of the inhabitants are farmers and laborers.

The proportion of risk factors in the source population was 15-75% (25, 26). In order to detect an odds ratio of at least 2, with the power of 90% and confidence level of 95%, minimum of 692 was calculated as the sample size. Total numbers of 800 children under-five years of age were enrolled for the study incorporating refusals and incomplete information. The inclusion criteria of the study were children 0-59 months of age irrespective of child’s gender, ethnicity and religion. Only the last born child of the family who was under five years of age was enrolled. If a person in the family had more than one wife, then the youngest child of either of the wife was enrolled. In case of twins, one child was randomly selected. Exclusion criteria included adopted child or step child (for either of the parents) and child with congenital malformation. The respondents of this study included child’s parents. The informed consent was taken from the child’s parents.

A pre-tested questionnaire was used to obtain information from the respondents with precision. Altogether four data collectors were hired for the conduct of survey. Manual of instructions was designed to orient the research team with the overall conduct of the study.
Protocol for anthropometric measurements (7) was physically demonstrated on children during the training sessions. The anthropometric measurements were converted into three indices: weight for age, weight for height and height for age. To calculate anthropometric indices, the information regarding the child's age in months, sex, weight (kg) and height / length (cm) were entered into nutritional anthropometric program in Epi Info. These indices were then expressed as Z-scores relative to the international [National Center for Health Statistics (NCHS) / Center for disease control and prevention/ World Health Organization] reference population. A child nutritional status was then categorized by his/her Z-score. A child was defined as underweight/wasted/stunted if the Z Score was less than that of a child with a value 2 SD below the reference median (NCHS). Multivariate analysis was done through Multiple Logistic Regression model (SPSS Package version 7.5) to adjust for confounding. The study adheres to the Declaration of Helsinki for research involving human subjects.

Results
The descriptive results are based on 800 records. Out of 800 records, 19 records were flagged (based on nutritional anthropometry package). Flagging occurs when the value for indices becomes out of range which happens due to incorrect measurements. Response rate of the study population is 97%. Bivariate analysis is based on 781 records.

In the study population, boys were in majority (56.3%), while there were 43.8% girls. The mean (± SD) age of the boys was 25.34 (±16.48 months), while mean (± SD) age of the girls was 25.75 (± 15.90 months). Breastfeeding history indicated that, 92.3% of the children were ever breastfed with mean (± SD) duration of breastfeeding as 15.05 (± 7.90 months) and the mean (± SD) age at which the weaning started was 6.26 (±2.03 months) (Table 1).

Only 1.9% of the parents were able to recall the documented birth weight of their child. When enquired about the child's appearance, 56.5% of the parents responded that their child looked normal at the time of birth, while 28.4% said that their child was under weight and 15.1% of the parents were unsure about the child's appearance at birth (Table 1).

Morbidity status of the children was also recorded at the time of interview. Diarrhea symptoms were positive in 32.6% of the children while 39.4% of the children had symptoms of Acute Respiratory Tract Infection (ARI) (Table 1).

When child factors were considered for the univariate analysis, the risk of wasting did not vary with child's gender (OR=1.1, 95% CI 0.74-1.52) (Table 2). Low birth weight (Parents perspective) was identified as a risk factor for wasting i.e., children who had low birth weight were 1.6 times more likely to be wasted as compared to children with normal birth weight (OR=1.6, 95% CI 1.07-2.36). Prolonged breastfeeding had protective effect on child's wasting (OR = 0.7, 95% CI 0.43-1.02) (Table 2). Symptoms associated with diarrhea (OR = 1.2, 95% CI 0.80-1.69) and ARI (OR=1, 95% CI 0.67-1.39) were insignificant factors in child's wasting (Table 2).

After assessing the variables for multicollinearity, multivariate analysis was done through Multiple Logistic Regression model (SPSS Package version 7.5) to adjust for confounding. The study adheres to the Declaration of Helsinki for research involving human subjects.

Table-1: Percentage distribution of various factors among study population n=800

<table>
<thead>
<tr>
<th>Factors</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>450</td>
<td>56.3</td>
</tr>
<tr>
<td>Female</td>
<td>350</td>
<td>43.8</td>
</tr>
<tr>
<td>Breastfeeding History</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>738</td>
<td>92.3</td>
</tr>
<tr>
<td>No</td>
<td>62</td>
<td>8</td>
</tr>
<tr>
<td>Birth Weight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Known</td>
<td>15</td>
<td>1.9</td>
</tr>
<tr>
<td>Not-known</td>
<td>785</td>
<td>98.1</td>
</tr>
<tr>
<td>Birth Weight in Parent’s Perspective</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>452</td>
<td>56.5</td>
</tr>
<tr>
<td>Under weight</td>
<td>227</td>
<td>28.4</td>
</tr>
<tr>
<td>Don’t know</td>
<td>121</td>
<td>15.1</td>
</tr>
<tr>
<td>Symptoms of Diarrhea (Past Two Weeks History)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>261</td>
<td>32.6</td>
</tr>
<tr>
<td>No</td>
<td>539</td>
<td>67.4</td>
</tr>
<tr>
<td>Symptoms of Acute Respiratory Tract Infections (ARI) (Past Month History)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>315</td>
<td>39.4</td>
</tr>
<tr>
<td>No</td>
<td>485</td>
<td>60.6</td>
</tr>
<tr>
<td>Boy’s age (in months)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>25.34</td>
<td>16.48</td>
</tr>
<tr>
<td>Girl’s age (in months)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>25.75</td>
<td>15.90</td>
</tr>
<tr>
<td>Breastfeeding duration (in months)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>15.05</td>
<td>7.90</td>
</tr>
</tbody>
</table>
Table-2: Percentage Distribution of Selected Risk Factors by Status of the Child in Study Population n=781

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Status of the Child</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal n</td>
<td>Wasting n</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>345</td>
<td>56.3</td>
<td>268</td>
</tr>
<tr>
<td>Boys</td>
<td>345</td>
<td>56.3</td>
<td>268</td>
</tr>
<tr>
<td>Girls</td>
<td>268</td>
<td>43.7</td>
<td>1</td>
</tr>
<tr>
<td>Area of Residence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jhangara Town</td>
<td>363</td>
<td>59.2</td>
<td>80</td>
</tr>
<tr>
<td>Others villages</td>
<td>250</td>
<td>40.8</td>
<td>88</td>
</tr>
<tr>
<td>Birth weight (parents perspective)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>357</td>
<td>68.4</td>
<td>83</td>
</tr>
<tr>
<td>Underweight</td>
<td>165</td>
<td>31.6</td>
<td>61</td>
</tr>
<tr>
<td>Breastfeeding (duration)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 12 months</td>
<td>188</td>
<td>39.1</td>
<td>56</td>
</tr>
<tr>
<td>&gt;12 months</td>
<td>293</td>
<td>60.9</td>
<td>58</td>
</tr>
<tr>
<td>Diarrhea Symptoms (two weeks history)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>415</td>
<td>67.7</td>
<td>108</td>
</tr>
<tr>
<td>Yes</td>
<td>198</td>
<td>32.3</td>
<td>60</td>
</tr>
<tr>
<td>ARI Symptoms (past month)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>367</td>
<td>59.9</td>
<td>102</td>
</tr>
<tr>
<td>Yes</td>
<td>246</td>
<td>40.1</td>
<td>66</td>
</tr>
</tbody>
</table>

Table-3: Final Regression Model for Wasting: factors associated with wasting in children

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Coefficient (SE)</th>
<th>Adjusted OR</th>
<th>95 % CI</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area of Residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jhangara Town</td>
<td>0.576 (0.211)</td>
<td>1.8</td>
<td>1.17-2.69</td>
<td>0.00</td>
</tr>
<tr>
<td>Other villages</td>
<td>0.576 (0.211)</td>
<td>1.8</td>
<td>1.17-2.69</td>
<td>0.00</td>
</tr>
<tr>
<td>Breastfeeding (duration)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 months</td>
<td>-0.424 (0.210)</td>
<td>0.6</td>
<td>0.43-0.98</td>
<td>0.04</td>
</tr>
<tr>
<td>&gt;12 months</td>
<td>-0.424 (0.210)</td>
<td>0.6</td>
<td>0.43-0.98</td>
<td>0.04</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.795 (0.190)</td>
<td>1</td>
<td>0.80-1.69</td>
<td></td>
</tr>
</tbody>
</table>

various possible subsets were tried to get a best-fit model. Area of residence and prolonged breastfeeding were identified as the risk factors in the main effect model. Interaction terms i.e., area of residence and prolonged breastfeeding were introduced but it had no impact (P-value criteria), so the main effect model remained as the final model.

Area of residence came out as an important associated factor with child’s wasting. Children living outside the Jhangara town were 1.8 times more likely to be wasted as compared to those living inside the Jhangara town (OR=1.8, 95% CI 1.17 – 2.69).

The effect of prolonged breastfeeding on wasting being identified as a protective factor in univariate analysis (Table 2), remained protective factor even after adjusting the effect of the other factors (Table 3). The children who were breastfed for longer than 12 months were 0.6 times less likely to be wasted compared to those who were breast fed up to 12 months (OR=0.6, 95% CI 0.43 - 0.98). The multivariate model for wasting is illustrated in Table 3.

Discussion
The study demonstrated significant association with prolonged breastfeeding and the area of residence with prevalence of wasting among children under-five in Jhangara town. Effect of prolonged breastfeeding is protective against wasting in the study population. The children residing outside the Jhangara town were found to be at increased risk of being wasted, possibly due to the low accessibility of Rural Health Center (RHC) situated near the study site. The association of child's low birth weight regardless of child's sex appeared as a risk factor toward the development of wasting in bivariate analysis but was not significant in the final model.

Various studies involving infant feeding practices have indicated that inappropriate feeding practices can have profound consequences for child’s growth and development, especially in LICs (18, 27-29). Study in Indonesia also highlighted the practice of suboptimal infant feeding among mothers of mildly wasted children (21). Finding obtained from our study significantly highlights that prolonged breastfeeding (continued till 2 years) act as a protective factor in reducing the risk of wasting (21). Evidence from China also showed that the children who were breastfed more than 12 months had higher weight for height Z-score compared to children who stopped breastfeeding before their first birthday (30). Study in Bangladesh also documented positive correlation among recommended feeding duration with gain in length and weight during infancy (31). Furthermore, the risk of morbidities and mortalities in children under-five has been found to be associated with suboptimum breastfeeding practices (3). Therefore, findings from our study and established evidences from studies around the world corroborates the importance of adhering to child breastfeeding practices i.e., exclusive breastfeeding for the first 6 months of life and continued breastfeeding up to the second year of life (31, 32) for optimum growth and development of young children.

The prevalence of ever breastfeeding for the last

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Pakistan Journal of Public Health, 2013 (September)
born child in this study was 95%. A survey in Pakistan has reported that the prevalence of ever breastfed children five years preceding the survey was 94% in rural areas (33). Furthermore, this study also noted that majority (60.9%) of the children were breastfeed for > 12 months. Similar findings have been documented in recent NNS which reported increased (78%) children were breastfed up to fifteen months (24). Children residing in poverty-stricken countries face interconnected chain of complications; illiteracy due to poor socio-economic status which further manifests as inadequate maternal nutrition, which in most of the cases result in low birth weight babies. In addition to improper breastfeeding practices, low birth weight has also been identified as a potential contributing factor toward child’s under nutrition (14). Likewise, findings from this study also indicated low birth weight as a risk factor for child’s wasting with no major effect on child’s sex. In contrary, child’s sex alongside birth weight and few other variables such as socio-economic status and poor sanitation has been found to be associated with child’s wasting (34, 35). Child’s birth weight is an important indicator of maternal nutrition. Mothers with inadequate nutrition are at high risk of delivering low birth weight babies (36). Hence, we emphasize the need for adequate maternal nutrition throughout her reproductive years through availability of required maternal and child health (MCH) care services in easy accessibly and the need for dietary health education during antenatal period.

The study findings also highlight the area of residence as a risk factor for child’s wasting, by exhibiting that the children living outside the Jhangra town were at increased risk for wasting. As there was only one RHC situated in the Jhangara town, which was the only health facility in the Union Council. The facility was readily accessible to the residents of Jhangara town compared to people living outside the Jhangara Town; which possibly indicated towards appropriate child growth monitoring and health education practices for families in close proximity with RHC. Families of under-five year old children living outside the Jhangara town could have possibly been faced with difficulties in accessing the MCH services which manifested in high prevalence of wasting. Inadequate MCH care practices and health care services has been found to be linked with inadequate dietary intake among children under-five years of age alongside infectious diseases which ultimately result in wasting (37). However, documented effect on child’s wasting with regards to the distance from a health care facility and area of residence has not yet been established.

Reducing the prevalence of wasting among children under-five years of age, by bringing improvement in overall child growth and development would not be improved by addressing the individual factors. Therefore, we recommend to use the Social Determinants of Health (SDH) framework by WHO (38) to address this issue. The commission on SDH by WHO recommends improving the well-being of girls and women and the circumstances in which children are born, to overcome the inequitable distribution of resources in the community by strong governance and stewardship and to measure and assess the problem (38). All these factors can holistically address the phenomenon of wasting and associated complexities leading to ill health. Further, we recommend use of nutritional interventions i.e., use of energy dense food for high risk children and identified children with wasting. This recommendation is based on study in Niger which showed remarkable reduction in prevalence of wasting and severe wasting among children with nutritional intervention (39). It must however be noted that food preparation needs to be adapted in local context. Moving forward, there is a need for assessing the effectiveness and efficiency of nutritional interventions in local context for reducing the prevalence of wasting in children under-five as there is paucity of evidence in this regard (39).

Follow up studies would be needed to assess the degree of improvement in high risk children and identified children with wasting with prolonged breastfeeding. And to measure the association of wasting with the area of residence (inclusive of socio-economic indicators and availability of health center) and various nutritional interventions.

Strengths of the study included use of local events and Islamic calendar to get much precise response from study respondents. Beside this validated questionnaire was utilized, quality assurance measures were also adapted such as close motioning of field workers at the time of interview, double data entry to ensure the quality of the obtained data. Every study has its limitations. The effect of both environmental and genetic factors is expected to have been obscured because children from most effected (e.g. most socially deprived) families happened to be most malnourished and already passed away, this created a built-in bias in the study, because the children who were alive were enrolled for the study. Further, recall bias by the
respondents could have affected the study findings.  

Conclusion  
Wasting, or low weight for length/height is among the important child health indicators. Findings from this study adds credence to earlier studies in providing a strong evidence to support current infant feeding recommendations by WHO for optimum child growth and development, thereby preventing the risk of wasting among children under-five years of age. Further, high prevalence of wasting in children living at the outskirts of Jhangra town reflects the role health care facility located inside the town and its possible role in contributing toward low prevalence of wasting. Efforts are needed not just to promote recommended breastfeeding practices by educating mothers but also to overcome various constraints in child's optimum growth and development which potentially contributes to wasting. Therefore, we recommend following the WHO-SDH approach to reduce the prevalence of child's wasting. Furthermore, efforts are also needed to test the efficacy of nutritional interventions to combat child's wasting in local context.  

Acknowledgement  
First author conducted the study and analyzed the study findings; while the second author mainly contributed in manuscript development. Later, both authors proofread the final manuscript.  

Conflict of interest  
We declare that we have no competing interests associated with this study.  

Financial disclosure  
This study was funded by the LASMO Oil Company Pakistan LTD and we are thankful for their support.  

References  
17. Breastfeeding Promotion Network India (BPNI):


Social determinants of health and adherence to tuberculosis therapy for patients living in Karachi: A qualitative study

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Abstract

Background: Tuberculosis (TB) is the second leading cause of deaths due to infectious diseases after HIV globally. The treatment of TB is a long term therapy and therefore adherence to the treatment is crucial for good outcomes, however, in low and middle income countries there obstacles to compliance. Pakistan has a high burden of tuberculosis (TB) and treatment compliance is known to be low with high default rates. The latter has resulted in the emergence of multi-drug resistant TB. This study aimed to identify the social determinants of adherence to Anti Tuberculosis Therapy (ATT) among TB patients in selected towns of Karachi.

Methods: The research objective of this research was to identify the determinants of compliance to Anti Tuberculosis Therapy (ATT) among TB patients in towns of Karachi, Pakistan. A qualitative study was carried out in Karachi from January 2012 to March 2012 to identify the key social determinants of adherence(or compliance) ATT. In this respect, 10 TB patients and 5 physicians were interviewed using a semi-structured instrument based on a theoretical framework for health related behavior. The notion of judgment in qualitative sampling was used to select potential study participants.

Results: Both facilitating and impeding determinants that influence participants’ adherence towards TB treatment were identified. Determinants that positively affect an individual's adherence include good behavior of the doctor, family support and correct knowledge about the disease. Barriers to treatment adherence include poor knowledge about the disease, lack of adequate counseling by health personnel, low financial status and distant health facilities. Were there any differences between men and women? Was there any difference between ages?

Conclusion: Various factors related to the social determinants of health from an individual level (e.g. education, access, economic status), to the health care system level where the behaviour of health professionals played a role in treatment adherence. Human Resource Managers and Policy makers need to focus on improved communication skills of health care providers, fostering awareness among the patients about adverse outcomes of non-adherence and establishment of diagnostic and treatment facilities in the distant areas could improve adherence to ATT.

Key words: Tuberculosis, Anti-Tuberculosis Therapy, Compliance, Social Determinants (Pak J Public Health 2013; 3(3): 9-15)

Introduction

Tuberculosis [TB] is also called the “White Plague” is an infectious disease caused by Mycobacterium tuberculosis. It is the second leading cause of deaths due to infectious diseases after HIV causing an estimated 1.2–1.5 million deaths across the globe in 2010 (1). Global incidence is estimated to be around 128 cases per 100 000 population, which makes an estimated 8.8 million incident cases of TB (1). Of the estimated new cases, around 59% of the cases occurred in Asia and 26% in Africa. Pakistan is ranked 5th among countries with the largest number of incident cases, in 2010 (1). Though effective chemotherapy for TB was introduced in the 1950s (2), it still remains a major public health problem and World Health Organization (WHO) declared TB as a “Public Health Emergency” in 1993 (2). Despite the effective combination therapy, the emergence of multi-drug resistant (MDR) and extensively drug resistant TB (XDR) has posed another challenge to the TB control (3). Emergence of drug resistance is attributed to two factors i.e. either erroneous prescription by the practitioners or irregular intake of medication by the patients (4).

Since the treatment of TB is long-term adherence
to treatment is often poor. Many factors such as economic and structural factors, patient-related factors such as knowledge about TB and a belief in the efficacy of the medication and depression and psychological stress, complexity of regimens, relationship between health care provider and the patients, patterns of health care delivery, distance of health care facility, family support, stigma and shortage of drugs (5-8) have been identified for non-adherence to the anti-tuberculosis therapy (ATT). Other factors which cannot be altered including ethnicity, age, gender or literacy were also associated with poor adherence (9).

Since Pakistan is a high burden country with recent prevalence rate estimated through a national survey were 364/100,000 population and incidence rate of 231/100,000 population (1). WHO launched Direct Observed Directly Observed Treatment Short course (DOTS strategy) in 1994 (10). Pakistan adopted this strategy in 1995 and in 2005 DOTS reached to all public health facilities (11). Poor adherence is also a challenge to control TB in Pakistan. According to National Tuberculosis Control Program (NTP), the default rate was 5% in 2010, while a study conducted in a private hospital in Karachi showed default rate around 27% (12, 13). A study conducted in a chest clinic of a teaching hospital was aimed at primary default rate i.e. patients after being diagnosed did not reported to clinic for starting treatment (14).

The rationale for this study was that to our best knowledge no research has been undertaken to explore the factors related to poor adherence among TB patients. Therefore the aim of our study was to explore and identify determinants of poor adherence to ATT among TB patients in Karachi.

Methodology
The Department of Community Health Sciences, Aga Khan University in Karachi, is implementing a pilot project on the “Implementation of Public-Private Mix (PPM) model” in six selected towns of Karachi city (Baldia, Kemari, Jamshed, Korangi, Gulshan and Gulberg towns). Karachi, for administrative purposes is divided in eighteen geographical regions called “Town”. At each of these towns the private practitioners were provided with formal training, the provision of drugs and other support to implement Directly Observed Treatment Short-Course DOTS effectively (15).

A qualitative approach was adopted to explore our research question. Compliance or adherence to treatment is related to behavior patterns and a qualitative approach provides an in depth insight into what influences this behaviour.

Case study was used as our approach. The patients of tuberculosis were interviewed, both that were adherent to TB treatment and those who were non-adherent. By this approach we explored the major determinants that drive an individual to complete the therapy or discontinue it. General practitioners that were involved in TB DOTS project were also included to take their views regarding poor adherence of TB treatment. General practitioners are the gatekeeper in the health care system and patients get treatment from them. Since the aim of the study was to explore the factors influencing the decision for adherence to the treatment, therefore the selection of both types of the patients and the care providers will be useful in understanding the factors. A semi-structured interview guide for patients that was inspired by the theoretical framework was developed (16). The interview guide was also evaluated in the light of other literature on adherence which indicates the importance of other factors such as regimen related factors and health service related factors (17-19). This framework is being validated and has been used previously (Fig.1).

![Fig. 1 Cumming’s Theoretical framework](source)

Source: Bringing the models together: an empirical approach to combining variables used to explain health actions by Cummings KM, Becker MH, Maile MC. Journal of Behavioral Med.

Since this study was done in the tenure of TB DOTS Public Private Mix (PPM) project run by Department of Community Health Sciences (15). The information and details about the patients and general practitioners was taken from the study project. Community Medicine Residency Program of Aga Khan University committee reviewed the proposal for ethical considerations. Verbal informed consent was taken from
study participants (i.e., patients and general practitioners) after explaining the purpose of interviews and assurance of anonymity.

**Data collection procedures:**
For this qualitative study, we included 10 TB patients (5 adherent and 5 non-adherents) for in-depth interviews based on a convenience sampling strategy. The reason behind selecting 10 patients as sample is directly related to the nature of project which was conducted. It looked at who were the adherents to the therapy and those who did not adhere to it. Adherent patients are defined as TB patients who completed ATT of 8 months without any interruption (1). Non-adherent patients are defined as TB patients whose ATT was interrupted for 2 consecutive months or more (1).

We took last 3 months’ data of all patients enrolled in the project. The participants were contacted through their respective general practitioners and were asked to come for an interview to GP clinic. Most of the participants refused to come up for just an interview to the clinic with the reason stated that not having time for this activity. The time period of data collection was 10 days, so we contacted all (n=60 enrolled in last three months) the patients on telephone one by one and invited them to participate in the study. Contact numbers of participants were taken from project data base. Most (n=24) of the cell numbers were powered off as this is practice of population in Karachi that cell numbers are frequently being changed here. Some of the patients did not receive the call (n=15). Eleven participants refused to participate in the study. At the completion of 10 days of data collection, we finally recruited 10 participants; five were adherent to the therapy & five were non-adherent.

We purposely selected Baldia and Kemari town from which patients were recruited. Due to the similar socio-demographics characteristics of both towns, we chose these two towns. Participants who gave the consent, were described the purpose of study and asked them about their free time, so that the investigator team should contact them. Telephonic interviews were conducted with the participants in Urdu.

Five private practitioners from this AKU-PPM model were also invited for in-depth interviews. Themes for the in-depth interviews with these doctors included the current TB control program in the city, the main problems with and suggestions for the current TB program, treatment adherence of patients in the corresponding towns, and the main reasons for non-adherence. Interviews were conducted in GPs’ clinics by the investigator before or after their clinic timings. The responses were written by separate investigator.

**Data analysis**
Thematic analysis technique was used to analyze data. All interviews with patients and physicians were audio recorded. They were all transcribed later into Urdu and then in English manually. The telephone recordings of patients interviews were also transcribed in the local language first and then in English language. These processes were done by principal investigator and his team.

The data was analyzed by the two groups of researchers. The first group identified the topics emerging from the data. They were later on clubbed into a set of themes with the help of coding. After identification of topic and drawing themes, a discussion was carried with the second group of researchers to check the consistency of themes extracted from the data analyzed. And finally both the groups developed consensus on the key findings presented. To develop group’s consensus on the key findings, the theoretical framework proposed by Cummings (1980) on explaining the health actions was invoked.

**Results**
Various factors were found to influence decision making regarding medicine intake. These were knowledge and perception about the disease, social network, and attitude of health care personnel, financial factors and health care related factors. Factors positively affecting an individual for completion of therapy include behavior of the doctor, family support, and correct knowledge about the disease, good financial condition and easy accessibility to the health care facility. Table 1 presents a summary of study findings and their relationship to categories from our theoretical framework.

**Knowledge and perception about the disease:**
Knowledge and perception about the disease was found to be the important determinant of adherence of TB treatment. The health seeking behavior of the patients was also found to be important factor towards completion of therapy. A Non-adherent 42 year female told us that “I wasted a lot of time with Hakeem but no use; I think it’s better to consult a qualified doctor”. As, major chunk of the population uses traditional form of medicine, people tend to go to traditional healers first part. However, due to
lack of regulation, as in countries like Pakistan, their practices are not up to the standards. Therefore the participant thinks that it was wastage of time while initially contacting Hakeem, as she was not benefited from him. So, the health seeking attitude and having less confidence in modern medicine was also important contributor in determining whether one will complete the therapy or not. Lack of knowledge about the spread was also found to be important contributor to non-adherence to therapy. A non-Adherent 35 year female told that “I did not do anything about my family but taking medicine. Though I knew it does spread but how could I save my family? I didn't know”.

Social network:
Social support also found to be an important determinant of completion of therapy. It includes family support, social circle, persons that influence one's decision making. One of the adherent female patient aged 32 years told that “It was certainly due to my mother-in-law due to which I was able to complete my treatment. I will be always thankful to her for her continuous support”. Role of spouse in completion of therapy was also evident from our findings. One of male adherent patient 28 yr told that “My wife used to talk later but give me medicine first in the morning”.

One of the female non-adherent 42 year old patient told that “I usually forgot to take medicine as I have to look after my husband & children. There is nobody to remind me about the medicine”. Females in the family system of Pakistan have various responsibilities, and they have to take care of most of the matter related to the home. So, therefore, the participant was not getting any social support from her family regarding regular uptake of therapy.

Attitude of health care personnel:
Attitude and behavior of the health care personnel was also found to influence the patient to take medicine properly and timely. In our culture, the role of health care personnel is very important in the context that majority of the patients didn't know and had less awareness due to illiteracy. Therefore, the responsibility of completion of therapy lies with the behavior of the practitioner, how the practitioner deals and communicates with the patient. One of the adherents, a 19 year old male told that “Doctor said to me TB is rather stigmatized but it's not curse but if you don't take medicine properly, it is deadly”.

Lack of communication of the health care personnel with the patient is also found to be very important factor in poor adherence of anti-tuberculosis therapy. One of the non-adherent 25 year old female told that “Doctor did not explain well about the disease and ignored my complaints. He also did not involve my family for support”. This scenario is understandable in context of Pakistani as most of the health care providers in their private clinics usually have overburdened OPDs. Due to this, they are not able to give appropriate time to the patients and that is evident with the participant's comments.

Financial factors:
Stable financial condition of the household was also found to be one main factor that influences decision regarding medicine intake. One of the non-adherent 39 year old male told that “How can I continue my medicine. Hunger does not let us remember anything else. I am the only bread earner”. Although, anti-tuberculous therapy is provided free of cost by the Govt. of Pakistan, there are still financial issues regarding cost for going to the health care provider and also time taken out from their earning hours to meet the provider. These factors influence one's

---

Table 1: Relationship between study findings and categories from theoretical framework

<table>
<thead>
<tr>
<th>Theoretical Framework</th>
<th>Study Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perception of symptoms and threat of disease</td>
<td>Knowledge about the disease</td>
</tr>
<tr>
<td>Health care related factors</td>
<td>Attitude of health care personnel</td>
</tr>
<tr>
<td>Social network characteristics</td>
<td>Family support</td>
</tr>
<tr>
<td>Accessibility to health care</td>
<td>Financial factors</td>
</tr>
<tr>
<td>Demographic characteristics (social status, income and education)</td>
<td>Proximity to community</td>
</tr>
<tr>
<td>Regimen factors*</td>
<td>The study was not able to find responses in this domain.</td>
</tr>
<tr>
<td>Evaluation of health care **</td>
<td>Financial factors</td>
</tr>
<tr>
<td>Knowledge about disease</td>
<td>Wrong perception about disease</td>
</tr>
<tr>
<td></td>
<td>Not aware about basic sign and symptoms</td>
</tr>
</tbody>
</table>

*It related to adverse effect associated with anti-tuberculosis therapy (ATT)

**It is related to quality of health care that is being provided at the centre of TB treatment. Attitude and behaviour of health care personnel
attitude in deciding to interrupt anti-tuberculous therapy. Lack of financial stability and support from the government in this regard also prove to be crucial in defining the attitude and perception of patient regarding their treatment.

Free medicine provision from the health care facility was proved to be very helpful for those who cannot afford the price of the therapy. One of the adherent 31 year old female told that “My treatment was possible only because of this clinic and free medication. Otherwise it would have been a dream to get rid of this deadly disease”. Though the participants emphasized the cost of treatment but none of the participant pointed out consequences of non-adherence such as further complication and multidrug resistance which have even greater economic consequences.

**Health care related factors:**
Health care related factors include accessibility to the healthcare, relationship of the staff with the patients, quality of services provided at the facility etc. This factor plays an important role in determining the attitude of patient towards medication. There were various issues that were raised by the patients. Presence of health care facility near the home played a vital role in continuation of therapy of adherent patients, that able them to complete the medication. One of the adherent male 28 years old told that “Clinic is near to my home. That's why I had regular visits and completed my treatment”. Another non-adherent 45 years old female told us that “So many issues to look after at home. It takes 25 minutes for me to go to the clinic. It's very difficult”.

Unavailable diagnostic facility near community settings also was raised by non-adherent patients. Due to financial constraints, non-adherent patients were having problems in coming to health facility for taking medication on regular basis because they are not able to afford the transport fares. A general practitioner of Baldia town also said that “More labs should be incorporated as area is wide and many patients cannot afford to go”. Many adherent patients were also encouraged to use the health facility, as it was close to their homes.

**Discussion**

Why people adhere to therapy and why they don’t is a complex issue. Further, there are multitudes of factors influence adherence/non-adherence in our context of study. The important factors that influence the completion of therapy were knowledge and perception about the disease, social network, attitude of the health care personnel, financial factors and health care related factors.

We have used a theoretical framework that was developed after smallest space analysis done on the set of 109 variables representing 14 different models (16). A unified framework for explaining health actions was created keeping in view the terms of structural similarities and differences identified by a panel of judges who were the relevant experts. The reasons behind using this framework was that it addressed both the individual and health system related factors in describing health related behaviors. This provided meaning explanation of the behavior in the context as both domains (individual and health system related) influences individuals’ behavior about their health.

Non-adherence to treatment subsequently leads to adverse outcome (treatment failure, drug resistance and death) (20). One study result showed that many factors influenced adherence to ATT in Karachi, Pakistan including poor knowledge about TB, negative attitude of health care personnel, lack of family support, inability to access to health care due to financial factors and low socioeconomic status. Similar findings have been reported among patients in Brazil and Hong Kong (21, 22). Patients in Sub-Saharan African countries and in Singapore have been reported to default more frequently during the continuation phase (23-25). Most of the patients do not suspect TB at onset and were probably unaware of the disease before they present themselves to the health facilities (26).

Inadequate knowledge was a significant factor for non-adherence similar to the findings in Madagascar (26). Drugs used during the intensive phase rapidly reduce the number of tubercle bacilli (bacillary load) in the body and patients usually feel better shortly after start of treatment. Improvement in the general condition was cited among reasons for default and has similarly been reported in other studies as cause for default (23, 27, 28). In Pakistan, the government supports treatment of tuberculosis by providing free diagnostic services and drugs but other hidden costs, such as transport and opportunities lost during treatment exists. Similar were the findings in some Sub-Saharan African countries where socioeconomic factors such as low income and low education were linked to TB treatment non-adherence (23, 30).

Relationship between healthcare provider and patient is an important determinant of adherence to ATT.
These include poor service provider attitudes, awful experiences of tuberculosis patients towards the treatment center, shortage of drugs and poor access to health services as found in other studies (14, 23, 26, 27). The factors associated with unfavorable health facility included unavailability of drugs on scheduled appointment dates, failure by health provider to offer adequate health education about TB treatment. It was probably due to overburdened health care providers and weak capacity of the system to educate patients and provide follow-up and waiting too long for services.

Though our study has pointed out various factors that can affect the adherence to ATT but results should be interpreted cautiously as there are certain limitations. These include, general practitioners and patients were recruited from selected town, interviews were conducted on phone which may not provide a good interaction for exploration and interviews were not transcribed and translated by separate personnel. We initially tried to contact the study participants on their homes, but due to disturbed law and order situation in both towns (Baldia & Kemari) in that period when the data collection process was taken place, we as a last resort took the telephone interviews. Another limitation is that triangulation was not done to confirm the findings of the interviews. Ideally, information from other sources would have validated our findings from interviews conducted on telephone but it was not done in our study. We have tried to address this limitation by taking time from patient initially by asking them about their spare time for the time of the interview, so that the interview was conducted on the convenience of the participants and that helped us in exploring the perceptions and insight information regarding adherence to ATT.

**Conclusion**

Multitude of factors plays role behind decision about the continuation of treatment ranging from individual to the health care system levels. There is need to carry out further research at larger scale to include the perspectives of the provincial and national levels program representatives and experts. Policy makers should consider strategies to address the factors which were highlighted. There is need to improve the communication skills of health care providers; awareness among the patients about adverse outcomes of non-adherence and establishment of diagnostic and treatment facilities in the distant areas.

**Acknowledgements:**

We gratefully acknowledge the support provided by the TB DOTS Public Private Mix (PPM) project running by Department of Community Health Sciences, Aga Khan University by providing details of the patients and general practitioners and facilitating transportation during the data collection.

**References**

Effects of Divorce on Women’s Mental Health: an Epidemiological Survey
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Abstract

Background: Divorce as a social phenomenon has profound effects on families and children. The aim of this study was investigating the mental health in divorced women and effects of divorce on mental or psychological disorders.

Methods: This cross-sectional study was done on 150 divorced and 150 non-divorced women. Samples were randomly selected from two public and private family counseling centers. Demographic and DASS-21 questionnaires were used.

Results: Mean age of divorced women and control group were 36.7±6.5 and 34.6±5.5 respectively. There was the highest rate of divorce in the age group of 40-31. The average of marital life between divorced women was 7.34 ± 3.3 years and the mean age at the time of divorce was 30.2±3.6. Depression (p<0.014), stress (p<0.001), and anxiety (p<0.001) were more prevalent among divorced women. Mean scores for psychological dimensions among all divorced women were significantly more than non-divorced. There were significant relationship between divorce and demographic variables such as early marriage, social class and education level in divorced women.

Conclusions: Considering the impact of divorce on mental health, supporting programs and preventive strategies for groups at risk are necessary. Also some training courses and preventing programs can be effective for married people.

Keywords: Divorce; Mental Health; Anxiety; Depression; Questionnaire

Introduction

Now a day, divorce is one of the most controversial topics in societies and its rate has increased markedly in most countries. Some problems such as deviations, crimes, and suicides can be seen following the urbanization, modernity and progress in technology. Divorce is another consequence of these changes that can be related to structural transformations of society and has considerable effects on people. Many researches in Iran and other countries indicated some symptoms such as anxiety, depression, hopelessness, irresponsibility, and stress in families in which divorce has occurred. These symptoms in severe cases can lead to mental disorders such as severe depression, hysterical states, and even paranoia.

Divorce is a threat for basic needs and leads to anxiety as a natural response to critical status. In divorced families, children fear being abandoned, changing in life conditions, shame, and sin; they concern about later separation and fear later unknown problems (2, 3). Also there is the possibility of anxiety and depression for each of parents after divorce. On the other hand, divorce has profound effects on economic, social, and psychological conditions of men and women and it can also affect the whole of society. Some researches indicate that in divorced, single, separated and widowed men and women, mental disorders are more common than married people. Also there is the higher rate of depression in divorced people relative to widowed ones (for example due to death of spouse) (4). Some studies have reported a positive relationship between divorce and increased rate of suicide (5-7). Also according to investigations, there is the greatest likelihood of suicide (1.5 to 3 times) in divorced men and women in comparison with married people (8-10). Carr et al. and Koball and coworkers showed a reduction in cardiovascular disease and increase in mental health of married people relative to single and divorced ones (11, 12). Liu (2012), Waite and Hughes (2009) and other researchers believe that the physical and psychological health may deteriorate, at least temporarily, following marital disruption and divorce (13-14).

In present study, women were selected to survey mental disorders due to divorce. The reasons of selecting...
women were the more considerable effects of divorce on them and their susceptibilities for psychological disorders relative to men. These women had referred to public and private family counseling centers and had some mental symptoms such as depression, anxiety and stress.

The aims of this study were surveying the mental health in divorced women, analyzing the factors affecting on psychological disorders, and offering some strategies and solutions for this important group of society (Figure 1).

**Methods**

**Selection of participants**

This cross-sectional study was done on 150 divorced and 150 non-divorced women. They had referred to the two public and private family counseling centers in city of Khoy in year 2011. In both groups, with regard to inclusion criteria for participation in study, 84 and 66 samples were randomly selected from one public and one private center, respectively. Inclusion criteria for divorced women were no history of psychiatric problems prior to the divorce and willing to participate in the study and exclusion criteria were suffering from serious physical and psychiatric problems prior to the divorce and the experience of parental divorce. Non divorced women were routinely living with their husbands and also they were matched to divorced women for effective parameters such as age, educational background and socio-economic status. Before conducting, the aim of study was explained, informed consents of women were obtained and participants were assured that their information keep confidentially.

**Data gathering**

Data were collected by demographic and DASS-21 questionnaires and two psychologists helped to complete them. DASS-21 used to measure the three related negative emotional states of depression, anxiety and tension/stress. Since DASS scales can compare the severity of disorders, it can be used to evaluate the treatment progress during the time (16).

Validity and reliability have been evaluated based on psychometric researches. Antony and coworkers in 1998 analyzed DASS scales and they found that reliability, assessed using Cronbach's alpha, was acceptable for the depression, anxiety and stress scales and this coefficient for tree scales was 0.97, 0.92, and 0.95 respectively. According to the results, special values for these scales were 9.07, 2.89, and 1.23 which identified 68% of overall variance. Also surveying the correlation between two studies of Antony and coworkers indicated that the correlation coefficients between scales were depression and stress 0.48, anxiety and stress 0.53, depression and anxiety 0.28 (17).

Validity and reliability of DASS were determined by Samani and Jokar in Iran. They reported that the test-retest reliability for depression, anxiety and stress was 0.80, 0.76, and 0.77 and Cronbach's alpha for these scales was 0.81, 0.74, and 0.78 respectively (18).

After coordination with counseling centers, personal and other required information of participants such as number of children, age, and duration of being married were collected. All questionnaires were completed in presence of participants. Then researching group reviewed and checked the questionnaires to confirm accuracy of gathered data.

**Statistical Analysis**

After coding the questionnaires, the statistical calculations and analyses were performed using SPSS version 16. Proper descriptive and analytical statistical tests such as Chi-squared ($\chi^2$), one-way ANOVA and Pearson's correlation coefficient were used. The level of significance was taken as $p<0.05$.

**Results**

According to results, the mean age of divorced and non-divorced women were $36.7\pm6.5$ and $34.6\pm5.5$ respectively. The highest rates of divorce were seen in the age groups of 31-40 and 42-50, so about 48% of them were divorced in the middle age. Minimum and maximum ages of divorce among participants were 22 and 49 years. The survey of educational background of both groups showed that women with low education level had the highest percentage of divorce.
The average of marital life for divorced women was 7.34 ± 3.3 years (min: 2 and max: 16 years) and the mean age at the time of divorce was 30.2 ± 3.6. Depression (p<0.014), stress (p<0.001), and anxiety (p<0.001) were more prevalent among divorced women. The mean age of marriage in divorced and non-divorced women were 22.8±2.6 and 23.1±2.2, the minimum and maximum age of marriage were 17 and 28 years for divorced women and 18 and 30 years for non-divorced ones (Table 1).

**Table 1. Frequency of education levels in divorced and non-divorced women**

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Divorced Women</th>
<th>Non-Divorced Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency (percent)</td>
<td>Frequency (percent)</td>
</tr>
<tr>
<td>Illiterate</td>
<td>30 (20)</td>
<td>24 (16)</td>
</tr>
<tr>
<td>Elementary</td>
<td>30 (20)</td>
<td>30 (20)</td>
</tr>
<tr>
<td>High school</td>
<td>36 (24)</td>
<td>39 (26)</td>
</tr>
<tr>
<td>Diploma</td>
<td>36 (24)</td>
<td>36 (24)</td>
</tr>
<tr>
<td>Higher Education</td>
<td>18 (12)</td>
<td>18 (12)</td>
</tr>
<tr>
<td>Total</td>
<td>150 (100)</td>
<td>150 (100)</td>
</tr>
</tbody>
</table>

According to Table 2 that indicates the number of children, 33 persons (22%) had no child and 12 persons (8%) had 4 children at the time of divorce. 82% of divorced women and 74% of non-divorced women were housewives and the rest had a job outside the home. About 46% of subjects expressed that their familial problems began in the early years of marriage. 78% of women with marital life more than 5 years believed that the main cause of divorce is disputes in the first five years of marriage and its continuation till getting divorce. According to them, the first year of marriage is more critical in occurrence of agreements or disagreements.

**Table 2. The number of divorced and non-divorced women’s children**

<table>
<thead>
<tr>
<th>Number of Children</th>
<th>Divorced Women</th>
<th>Non-Divorced Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency (percent)</td>
<td>Frequency (percent)</td>
</tr>
<tr>
<td>0</td>
<td>33 (22)</td>
<td>24 (16)</td>
</tr>
<tr>
<td>1</td>
<td>54 (36)</td>
<td>63 (42)</td>
</tr>
<tr>
<td>2</td>
<td>33 (22)</td>
<td>27 (18)</td>
</tr>
<tr>
<td>3</td>
<td>18 (12)</td>
<td>24 (16)</td>
</tr>
<tr>
<td>4</td>
<td>12 (8)</td>
<td>9 (6)</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>3 (2)</td>
</tr>
<tr>
<td>Total</td>
<td>150 (100)</td>
<td>150 (100)</td>
</tr>
</tbody>
</table>

Non-divorced women had referred to counseling centers because of slight disputes with their husbands (54%), Mistreatment with children at home (24%), and some problems related to their relatives (22%). Results indicated that social factors (like addiction) were the most important parameter related to divorce (table 3).

**Table 3. Factors affecting on divorce occurrence (women’s opinions)**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Divorced Women</th>
<th>Non-Divorced Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Factors</td>
<td>55.7</td>
<td>57.8</td>
</tr>
<tr>
<td>Spouse personality</td>
<td>52.4</td>
<td>48.4</td>
</tr>
<tr>
<td>Cultural Factors</td>
<td>52.9</td>
<td>33.9</td>
</tr>
<tr>
<td>Economic Factors</td>
<td>28.4</td>
<td>26.8</td>
</tr>
</tbody>
</table>

Smoking, drug abuse, and moral corruption are contributory social factors to divorce. Some cultural factors like familial disagreements, inappropriate expectations, and being too strict and economic factors such as unemployment and low salary can be affects on divorce rate. Among the personal factors, irritability and husband’s lack of interest were important.

Most couples (56%) had met for the first time through their relatives or friends without previous familiarity, 16% of marriages were intra-familial marriages and the rest of couples had met in the workplace, university and other places. 57% of women were “boomerang children”, they had returned to live with their parents after getting divorce, and one third of participants had decided to live alone. Depression (p<0.014), stress (p<0.001), and anxiety (p<0.001) were more prevalent among women who lived with their parents. Based on results, there was significant difference between divorced and non-divorced women in relation with mental health problems. Subjects complained of more severe anxiety and stress in comparison with depression. The late symptom (depression) was more prevalent in divorced women who lived alone (p<0.001). Table 4 indicates the scores related to different levels of depression in both studied groups. In most levels there were significant statistical differences (p<0.005) between two groups. About 10% of divorced subjects had extremely severe depression and 16% of them had severe level of this symptom.

**Table 4. Comparing the mean of scores related to different levels of depression in studied groups**

<table>
<thead>
<tr>
<th>Depression Level</th>
<th>Studied Group</th>
<th>Mean</th>
<th>df*</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>Divorced</td>
<td>2.4</td>
<td>98</td>
<td>0.000</td>
</tr>
<tr>
<td>Mild</td>
<td>Divorced</td>
<td>3.2</td>
<td>98</td>
<td>0.005</td>
</tr>
<tr>
<td>Moderate</td>
<td>Divorced</td>
<td>4.8</td>
<td>98</td>
<td>0.065</td>
</tr>
<tr>
<td>Severe</td>
<td>Divorced</td>
<td>4.1</td>
<td>98</td>
<td>0.005</td>
</tr>
<tr>
<td>Extremely Severe</td>
<td>Divorced</td>
<td>2.8</td>
<td>98</td>
<td>0.001</td>
</tr>
</tbody>
</table>

* df: Degrees of Freedom
According to the correlation coefficient analysis and obtained results for different levels of anxiety and stress, getting divorce at the low age range and in first five years of marriage lead to increase in mental problems specially severe anxiety and stress. Correlation coefficients for depression, anxiety and depress were -0.54, -0.27, and -0.32 respectively. Anxiety was more common than two other symptoms and had significant relationships with age at the time of divorce and length of marital life (p<0.001). This study showed that divorced women had higher levels of symptoms of mental health problems than non-divorced ones. The severity of depression and anxiety had positive relationships with the time period of life after divorce (p<0.05). There was no similar relationship for anxiety (p<0.31). In subjects who had returned to live with their parents after divorce or had lower level of education, the lower scores of anxiety, stress and depression were seen (p<0.05) and this relationship was stronger for anxiety (p<0.001). The mean scores of depression, anxiety and stress for divorced women were 17.3, 17.1, and 14.9 respectively. These scores for control group were 13.4, 10.9, and 8.7. The total score for three symptoms in divorced and non-divorced subjects were 49.3 and 33.

Totally, variance analyses and comparing means indicated the mental health disorders in divorced women were more than control group and differences between two groups were statistically significant (p<0.05).

**Discussion**

It is worth to mention that most previous studies related to divorce have conducted based on judicial dossiers and legal databases for causes and factors affecting on getting divorce. Using proper questionnaires can be an effective tool to find important factors resulting in divorce and also impacts of divorce on mental health problems. In present study, questionnaires were completed for peoples who had experienced unsuccessful marital life. Findings of many studies, including the present one, confirm the fact that divorced women especially in lower classes of society should be considered as a vulnerable group. It can be led to finding effective factors in occurrence of divorce and subsequent mental disorders and reducing them via appropriate preventive measures.

According to results, the highest rate of divorce was seen in the age group 31-40 years that was consistent with studies by Foroutan (19) and Kposowa (20). Rahmani and et al. (21) obtained a different result, so that divorce rate was higher in the age group 20-24 years. The average age of divorced women participating in our survey was 36.7 years that is similar to the average 35 years obtained in Black Dog Institute in Australia (22). The mean age at the time of divorce was 30.2. The similar result reported by Foroutan and et al. (19) and Meshki et al. (23).

Since identifying the groups at the divorce risk and providing the training courses for them to have better life are the goals of family consulting centers, such centers should consider this age group of women to reduce the divorce rate and control its consequences. Determining target age groups can help allocating proper budget and other requirements to prevent divorces and related mental disorders.

The mean ages of marriage in case and control groups were 22.8 and 23.1 years, more than the ones obtained by Meshki et al. (23) but similar to Bastani results (24). In this study the mean length of marital life was 7.33 years that it is less than 14 years in Bastani survey (24).

Statistics show that the highest rates of disputes and divorces occur in first five years of marriage, so regard for this subject can help executing the training and preventive programs for couples to overcome probable familial problems. Investigations conducted by C.S Lewis on spousal support basics showed training courses for couples can considerably be effective to reduce marital conflicts and improve the quality of marital life. However such training programs will be successful if they hold in the beginning of marriage and continue at least in the first five years of marriage (25).

There was a significant relationship between the increase of education level and the severity of depression (p<0.04). On the other hand, the depression was less prevalent in women with lower education level and ones who living with their parents after getting divorce. Therefore the increasing of social supports for more vulnerable women is required, because the various consequences of divorce and inadequate supporting plans can lead to serious social and mental damages in target group. Since more educated women have more profound understanding and different attitudes about life conditions, they are exposed to more severe mental health disorders.

Families and social organizations can provide supporting programs for these persons to reduce their challenges and mental health problems and change their views for decreasing some concerns.
According to Meshki [23], most divorces occurred in the first five years of marriage (61%) and maximum rate of these divorces (77%) were seen in women having low education level like diploma and high school degree which were consistent with present study. Most divorces in this study were related to age less than 25 years (78%) and maximum of struggles leading to divorce had occurred in the first five years. Finding indicated that women had more tendencies to get divorced especially in the first five years of marriage, after that there was a decline in divorce rate, although in couples with marital life about 15-20 years the divorce rate had again increased. According to Scientific literature, in the past phenomenon of divorce was regarded as a problem in families with a low length of marital life and in younger couples, but today divorce rate in adult couples is rising. Based on formal and governmental statistics, in year 2010 in Iran, about 16900 divorces took place in men and women older than 50 years (26). Andrew J. Cherlin conducted a study on some divorced women at the age of 33 and reported that the divorce has had many adverse effects on mental health and behavioral patterns of them and these effects have increased over time.

Some studies report that parental divorce in childhood is associated with greater depression in adulthood (20-30 aged) (37). In spite of that a lot of studies have conducted on divorce effects on mental health, obtained results are not complete and comprehensive and more investigations are required to understand the pattern of long term impacts of divorce on individuals after the transition to adulthood. Some studies on mental disorders in old divorced subjects illustrated that they have an increase in mental health problems and symptoms like depression as they age (28).

According to McCoy (29), loss of possessions, loss of personal identity as a couple and as an individual, changing the role of divorced person are the main causes of stress and depression in women who live alone after divorce. These persons lose love, security, and belonging that come from relationships with others. Marriage is one of the most significant relationships and ending the familial life can lead to stress, depression and a lot of tensions for everyone especially women.

On the other hand, divorce does not in turn lead to misconducts and family disruption, but some other factors like social consequences may be considered as a root cause of misbehaviors. In this study, many divorced women (55.7%) believed that social factors are very influential factor in family disruption and can effect on occurrence of parental divorce and suffering other family members (30).

In conclusion, findings reveal the fact that disruption could trigger intervening events that negatively affected adult mental health. Also divorce can have many long lasting consequences on children such as difficulties with adult, feelings of insecurity and doubt, low self-esteem, and even drug and alcohol abuse. The decision to divorce can bring about major changes in the social lives of individuals. Compared with married individuals, divorced individuals are less involved in social activities. Divorced adults often face greater loneliness than married individuals. In addition to losing a spouse, they also lose many of their social contacts such as in-laws, married friends, and neighbors.

After divorce, some people feel that they are losing everything like jobs, homes, children, and self-esteem. Sometimes they have unhappiness, depression, alcohol abuse. Therefore, the society and related organizations should provide some opportunities for divorced people especially women to manage a new life and find little joy and satisfaction in that new life.

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Knowledge Attitude and Practices of Hygiene among Pir Mehr Ali Shah Arid Agriculture University Students in Rawalpindi: A Cross Sectional Survey
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Abstract

Background: “Hygiene refers to conditions and practices that help to maintain health and prevent the spread of diseases”. The objective of the study is to assess the knowledge, attitude and practices related to hygiene among male and female students in Pir Mehr Ali Shah Arid Agriculture University Rawalpindi.

Methods: Cross-sectional study was carried out to compare male and female students hygiene practices and knowledge among 216 students of Pir Mehr Ali Shah Arid Agriculture Rawalpindi. A self-structured questionnaire was used for assessment. Questions were pertinent to hygiene and hand washing knowledge, attitude and practices. A systematic random sampling method was used to approach the students in university. Statistical analysis frequency and chi square test were done by using SPSS.

Results: The survey of knowledge, attitude and practice of hygiene among university students showed that the knowledge of students regarding hygiene, hand washing and diseases awareness both male and female students overall percentage is good. Among them 82% male and 61% female students replied that they wash hand before eating at cafeteria while 69% male and 60% female students wash their hand after eating at cafeteria. However, 56% male and 65% female students were not satisfied with the condition of university wash rooms. The practice percentage result showed that female students have good practice in maintaining their hygiene as compared to male students.

Conclusion: Major finding of the study are the absence of safe drinking water, lack of soap and material to dry hand after washing and lack of clean wash rooms in education institution. Lastly, the study recommends that the government should provide these facilities to the education institutions, arrange seminars to improve the hygiene and control the risk of infection diseases in the education institutions and country.

Keywords: knowledge, Attitudes, and Practices, Hygiene, University students. (Pak J Public Health 2013; 3(3): 22-25)
The Centers for Disease Control and Prevention (CDC) has reported that the effective hygiene and hand washing is one of the best method to prevent from the risk of pathogens spread (4).

"Hand washing is an act of the cleaning hands with or without use of the water or another liquid or with use of the soap for the purpose of removing dirt, soil and microorganisms" (5).

"Poor hygiene knowledge and practice has been linked to the rapid spread of infection diseases like influenza in the class room that can affect the students" (6).

To understand the knowledge and behavior in institutionalized population is critically important to undertake any preventive and health education measure. Hygiene and hand washing practice in university is very important for public concerns.

The UNICEF Pakistan report shows that 80% of all the main disease like diarrhea, hepatitis and cholera are the reasons of lack of safe drinking water, poor hygiene and improper sanitation system. The infection diseases mostly spread in the developing countries like in Pakistan, where large number of population is spending their lives in the poverty conditions and do not have better system of the sewage disposal. The people do not have proper hygiene and the sanitation facilities in the education institutions, hospitals and in the public places. The universities and schools also, do not have sufficient facilities for hand washing and fresh drinking water. The statistics of Federal Bureau of Pakistan shows that 30% populations of Pakistan has no lavatory facilities. The estimated figure of hygiene, water and sanitation shows that the economy of Pakistan has to pay Rs112 billion for the related diseases and it spends Rs 300 million in terms of health in a day (7).

This study has been conducted to identify knowledge and attitude among Pir Mehr Ali Shah Arid Agriculture university students in reference to hygiene and their current hygiene practices including hand washing along with any gender differences associated with these practices.

The objective of the study is to assess the knowledge, attitude and practices related to hygiene among university in male and female students. The hypothesis of this study is that Are the male and female university students having good knowledge, attitude and practice related hygiene?

Methodology

A cross sectional study in Pir Mehr Ali Shah Arid Agriculture University Rawalpindi was carried out using structured self-administered questionnaire among university male and female students. A self structured questionnaire pertinent to hygiene, hand washing was developed and used for this study. It was pilot tested to check the validity and reliability and changes were made accordingly. In addition, an observation check list was developed to assess the facilities provided to the students by the University for Hygiene and hand washing. Statistical analysis was done using SPSS version 16. The frequency tables and Chi Square were used to quantify the occurrence of hygiene knowledge, attitude and practices. This study was conducted in Pir Mehr Ali Shah Arid Agriculture University situated in Rawalpindi in 2012. The total number of enrolled students is 5605.216 total students (108 male and 108 female) were part of this cross sectional survey. 216 sample size were calculate by using formula of Difference between two proportion. A self administered questionnaire was used for collecting data. A systematic random sampling method was used to approach the students in Sociology, Economic, DVM, Agriculture, Zoology, Botany departments in Pir Mehr Ali Shah Arid Agriculture University Rawalpindi.

Results

The age distribution indicated 41% male and 45% female students were between the age of 15 and 20 years while 51% male and 54% female were between the age of 21 and 25 years. The results showed that the students have good knowledge regarding personal hygiene and 90 % male and female students agree that personal hygiene includes trimming of nail, teeth brushing, keeping hair and body clean, regular hand washing, most of the students have good knowledge regarding hand hygiene and 30 % male students and 44% female students think good hand hygiene should include washing hands with soap rubbing for 10 sec, rinsing with water and drying off. Overall result showed that 84% male and female students wash their hands with soap in all given conditions as compare to 16% male and female who answered different option while 15% male students and 25% female students agreed that 10 seconds should be spent to clean hand with soap. Among them 82% male and 61% female students replied that they wash hand before eating at cafeteria while 69% male and 60%
female students wash their hand after eating at cafeteria. Overall result showed that 71% male and female students wash their hand before eating in cafeteria as compare to 65% male and female students that wash their hand after eating in cafeteria. 69% male students and 72% female students considered Lice, Scabies, Typhoid and Diarrhea can be spread by bad hygiene and sanitation. Majority of the students 70% both male and female students agreed that good hygiene practices can help in preventing spread of infectious diseases. However 56% male and 65% female students were not satisfied with the condition of university wash rooms The overall results shows that 53% male and female students think that university has not enough toilets or latrines facility for the students.

The practice result shows that the female students have good practice in hand washing with soap female (72%) male (52%), brushing of teeth twice a day female (49%) male (36%) and maintaining nail hygiene female (72%) male( 68%) as compare to male students. On the other hand the result of the male students about hand washing practice at cafeteria is good as compare to the female students. The results are shown in Figure 1.

### Table 1: Showing chi square values compare the male and female student's knowledge, attitude and practices of hygiene

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>P-VALUE</th>
<th>SIGNIFICANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>When you should wash your hair?</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Where are the hands washing facilities located in the university?</td>
<td>.009</td>
<td></td>
</tr>
<tr>
<td>Do you wash your hands before eating at the cafeteria?</td>
<td>.001</td>
<td></td>
</tr>
<tr>
<td>Are drinking water containers properly covered?</td>
<td>.020</td>
<td></td>
</tr>
<tr>
<td>Are there separate toilets facilities for boys and girls?</td>
<td>.015</td>
<td></td>
</tr>
<tr>
<td>I always use soap to wash my hands?</td>
<td>.020</td>
<td></td>
</tr>
</tbody>
</table>

### Discussion

Results show that the knowledge of students regarding hygiene, hand washing and diseases awareness are good. Over all 90% male and female students are having proper knowledge about personal hygiene as compare to other study in which 52% students were having proper knowledge of the hygiene in school environment. This study also supported our findings which suggested that university students had a better knowledge regarding environmental hygiene. The overall practice of 58% male and female students to wash hand before handling food and after using toilet 86%, take bathe 63% and wash hair in week 63%, wear clean clothes 83% and 78% comb hair tidily before going to university show good result of both students. Our research findings are also consent to another study which conducted among the school children in Angolela, Ethiopia (8).

Most of our research findings are compatible with the past studies in developing countries that have focused upon the knowledge, attitude, and practices of the hygiene among the students.

Both male and female students are having positive attitude to wash their hand before 71% and after eating 65% at the cafeteria while another study from the Colombia indicated that 33.6% of students replied that they always or mostly washing their hand with clean water and soap before to eating anything. However the facilities provided by the university are not satisfactory. The overall 51% of male and female students are not satisfied with the condition of safe drinking water and 60% from the wash rooms. This result is consistent with another study conducted in school children of Colombian which showed that the clean water and the soap facility available to the 7% students in school (9).

The above result shows that the female students
have good practice in hand washing with soap (72%), brushing of teeth twice a day (49%) and maintaining nail hygiene (72%) as compare to male students. On the other hand the result of the male students about hand washing practice at cafeteria is good as compare to the female students.

CONCLUSION
This study focuses those problems that must be given importance when making any hygiene and health promotion policy. Educational institution does not have proper medical health officer who should visit the university and check the hygienic condition of university students. Most of the students were having proper hygiene knowledge but not having good hygiene practice. To achieve the goal of healthy population and healthy life, health centers can be formed to teach students about the causes of diseases and transmission, good practices of hygiene and washing hands with clean running water and soap, these facilities motivate the people for good hygiene. Education has a power that changes the behavioral patterns of students and it can also improve the hygiene practice.

The practices of good hygiene are also depending upon the provision of enough resources. The availability of enough hand wash basins facilities and toilets that having proper running water and soap are also very important for promoting good hygiene. If the hygiene programs are implement these two important interventions to providing education and the sufficient resources. These can be fulfilled the students needs in a better way and as a result the risk of infection diseases can be decrease in the education institutions and in the community. Students are more active to the learning and they also adopt the good healthy behavior to improve the hygiene and control the infectious diseases in educational institutions as well as their homes. They can also play very important role to bring effective change to spreading the knowledge and education about health and hygiene which they have learnt in the educational institutions and transfer it into their family members and community.

Limitation of this study
This research work is conducted in only one government university students in Rawalpindi so sample size 216 students' selects for this research. In further researchers needs to selects more than one universities and large sample size to assess the knowledge, attitude and practice of hygiene among students in government and private universities and education institutions.

Reference
Logistics management of public sector hospital laboratories in Rawalpindi: A case study approach

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Abstract

Background: Supply chains for laboratory supplies do not operate in a vacuum but rather within a larger context of laboratory management and policies of the larger health system. The approach to strengthening supply chains must expand beyond forecasting and quantification, inventory control systems, storage and distribution. Laboratory management, practices and policies have supply chain implications.

In most developing countries, such as Pakistan; hospital laboratories serve both a public health and a clinical role. Medical and public health laboratory services are a significant constituent of a country's national health system, as they are fundamental in disease diagnosis, prevention, surveillance, treatment, and outbreak investigations. On the other hand, laboratory services and networks in resource limited countries have been ignored and need to be strengthened to meet the goals of several major global health programs.

Method: A multiple case study utilizing mixed methodology approach, facility based study was undertaken in Rawalpindi city. Quantitative component of study was to assess the current logistics management practices for laboratory service / supplies and qualitative component was to explore the future prospects to strengthen the logistics of laboratory supplies.

Results: The study showed that current logistics practices have weak supervision, flaws in inventory management, lack of specialized transportation, discrepancies in storage condition and lack of personal protective equipments.

Conclusions: Based on research findings the current practices need to be revised and implemented on internationally accepted standards. To ensure the availability of commodities and information flow for evidence based decision by the health managers at facility and national level. The study proposes to improve the laboratory services for effective health care delivery through innovative interventions that are cost effective.

Key Words: Logistics management, Hospital laboratories, supply chain, Pakistan.

Introduction

Managing supply chains in support of laboratory services is a formidable challenge, especially in developing countries (1). Intensifying programs for HIV, AIDS, T.B and malaria require strong and supportive laboratory services. Laboratory capacity depends on the availability of multiple commodities to be available simultaneously (2). Well-functioning supply chains will enhance availability of necessary laboratory services (3).

In most developing countries, such as Pakistan hospital laboratories serve both a public health and a clinical role (4). Medical and public health laboratory services are a significant constituent of a country's national health system (5), however with the beginning of HIV these laboratories have also become concerned with screening and surveillance activities and need to be strengthened to meet the Millennium Development Goals for Health and the International Health Regulation (6).

According to the council of supply chain management professionals, logistics management defined as "The part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirement" (7).

As in any industrial process, logistics in hospitals have two main chains i.e. internal chain and external chain. Management of the external supply chain to minimize the costs and the management of the internal
supply chain to maximize service levels (8).

A considerable number of studies related to supply chain management have been conducted on the healthcare industry even up to the recent years (8). In January 2008 Maputo declaration held for strengthening laboratory services focused by strong supply chain management in developing countries (9). A strong laboratory management information system allows a country to provide regular and accurate data for evaluating and planning future public health interventions (10).

Today’s global community cannot manage to pay for defective laboratory results (13), wasting valuable time, costly samples and in addition valued lives (14). Governments all over the world are getting increasingly concerned about their ability to meet their social obligations in the health sector (9). In Pakistan, there is a mixed health system syndrome (11) and the challenges in an environment where publicly-funded government health delivery coexists with privately-financed market delivery.

Ensuring smooth availability of supplies is essential for effective implementation of service delivery (9). In 2012 assessment of health facilities in district Rawalpindi was done on availability, functioning, and quality of health care services in public sector health facilities. Although this assessment covered the laboratory section but supplies for laboratory was not covered (12). This study would help in exploring the current practices regarding the logistics management with the aim of improving the laboratory services in public hospital of Rawalpindi city. This study can be used as baseline information for policy makers and concerned department managers to address these gaps.

Methods

A multiple case study approach utilizing mixed methods (quantitative and qualitative) was conducted to assess the current practices of logistics management and to ascertain the perceptions of laboratory staff regarding the logistics of their respective laboratories. The study participants included two interviewees from each area; Key informants or interviewees were selected that were familiar with the laboratory system. The study setting was the public sector hospital laboratories in Rawalpindi city. The study was conducted over a time period of 3 months i.e. May 2013 to July 2013.

Convenient and purposive sampling design has been used in the study. All public tertiary care hospitals of Rawalpindi city were selected. The period of data collection was 2 weeks. Primary data and secondary data was used in the study. Questionnaire were pretested, piloted, and then modified and used. Secondary data collection was related to any relevant reports, documents etc from each of the case study sites. Data was analyzed in 2 stages.

The data from the structured questionnaire were coded and entered into SPSS. Statistics were based on percentage and frequencies. The open ended responses were analyzed manually. The results were compiled thematically and triangulated with the quantitative results.

This research study had been ethically cleared and approved by the Research and Ethics Board of the Health Services Academy Islamabad. Permission to conduct the study and to collect information was also requested from the concerned head of institutions.

Results

Study results have been presented in two parts. First part comprising the current practices of logistics management and second part consists regarding perceptions of logistics management. Hospital laboratories were maintaining bench mark stock levels except for emergency level only 8.75% have set point for emergency level of stock to avoid stock out during outbreaks. Review of stock level for reagents and supplies is carried out on quarterly basis. Process of stock taking (physical inventory review) 41.7% is never conducted for supplies and reagents. Stock cards (15.6%) were used for tracking of reagents and consumable. No of test performed (78.3%) in the last year or month were used as major element for the calculation of new order of supplies. Just over half (54.5%) of the facilities also send order to the private suppliers in the open market for local purchase to carry out day to day activities. Ninety percent (90%) of the facilities have placed emergency orders due to stock out of various essential reagents to continue their service delivery.

Under normal circumstances lead time of supplies was 25-30 days. More than 90% facilities faced delays in receiving supplies. Major reason of delay in supplies was unavailability of commodities (55%) in the country. laboratories generate reports on stock on hand (72%), consumption data (81%) of consumables for diagnosis or conformations. Only 36% facilities sent reports of surveillance to the concerned department of
vertical programs for further action on these reports. The above stated reports were sent to concerned manager on monthly, quarterly and as required (41.7%) basis.

In most of the cases (84.1%) facility makes arrangements for collecting reagents and consumables for the laboratory services from the hospital medical store, central district store and as well as provincial store for the supplies of vertical programs. Ninety percent (90%) facilities have access to vehicle for laboratory services. More over approximately 67% have faced various problems in transportation of laboratory supplies.

Most of the facilities were stock out on the day of visit, i.e. HIV screening kits and confirmatory kits were not available and these were stock out more than last thirty days. Majority of the items for infection controls except Biohazard bags were available at the facilities on the day of visit. Just over one third (33.3%) facilities were following the practices of storing flammable and hazardous chemical in specialized areas. Over ninety percent (91.7%) participants follow the FEFO (First to Expire First Out) practices in daily routine. Training and capacity building opportunities, supervised quality control measures with frequent flow of information and shift from paper log book to digital system can lead to better understanding of Logistics management were thematically obtained results.

Discussion
Harmonization and standardization of laboratory services requires strong Ministry of Health leadership and organizational coordination as per the six building blocks of Health Systems (15). The benefits could include reduced procurement costs for consumables, reagents, and service contracts by using economies of scale. and easier implementation of quality assurance and comparability of services between laboratories (16). Harmonized and standardized supply chain management will enhance the coordination of public and private sectors and development of partner contributions to improve planning (4). The drawback, however, is overreliance on similar platforms and vulnerability to supply bottlenecks (17).

The data from the study revealed that the requirements of reagents are generally known and the items are rather standardized for use in any department in the hospitals. The use of periodic review and standard replenishment method would be a good inventory management policy.

Laboratories generate various reports on use full elements, surveillance reports are help full for determining the change in patient mix i.e. epidemics or outbreaks. These reports act as springboards for future decisions.

Information and Communications Technology (ICT) plays a greater role in enhancing logistics efficiency in the health care industries (8). The interviews showed that laboratories have at least one in-house central warehouse. These hospitals have not implemented SAP systems to monitor the stock levels between individual storage areas and the central warehouse. Proper storage and distribution of commodities is important in assuring quality consumables avoiding any interruption in supply.

In this study, it was found that there were no proper written guidelines for handling and storing laboratory consumables at facility level. The unavailability of the specialized cold chain vehicle from district to facility and intra-facility carriage of these supplies was also recognized. Sub-standard transportation can lead to compromised quality.

The laboratories in these facilities were supposed to give service to both the outpatient and inpatient departments (18). The quality assurance system practiced in the laboratories was generally either very weak or non-existent. Therefore, networking of the laboratories in the country should be given priority for all activities to be conducted within the laboratories which could solve the problems related to training (including refresher courses), maintenance, and systems of reagents, equipment procurement and replenishment.

In regard to laboratory services, the WHO, during the 58th session of the regional committee for Africa, underscored the need to establish and strengthen laboratory leadership (19). Countries were urged to establish strong laboratory leadership to ensure that the laboratory agenda is a central component of strengthening national health systems.

Leadership and high-level political commitment have been demonstrated to have a key role in the success of the national response to the HIV/AIDS epidemic in Uganda (20), laboratory supply chain standardization in Pakistan can be poised to benefit from similar leadership.

Conclusion
Supply Chain Management is designed to include best practices of the industry to streamline the entire process from ordering to supply through delivery processes (21). These processes includes efficient management and
distribution of products/services for timely delivery of high-quality medical care. The data from this study contributes useful information on current practices of supply chain management and possible factors that will improve organizational performance through improved supply chain management. As the results suggest by successful implementation of cold chain transportation can attained through continuous supply chain innovation with supplier cooperation, multiple indicators for inventory monitoring to ensure smooth availability of laboratory supplies, organization leaders must nurture an excellent work environment, which includes providing right resources to support efficient operational processes which in turn improves organizational performance. Furthermore healthcare organizations should investigate the potential benefits that can come from IT-enabled Supply chain management.

Policy Recommendations:
The laboratory policy takes care of the organization of the laboratory system by putting in place the management structures, reporting systems, guidelines, and advocacy for the other components of the laboratory quality management system (24). It is therefore recommended that:

- Consistency is a requirement to amplify laboratory logistics systems.
- Offer trainings in logistics management measures to laboratory staff members, and launch a system for communicating information on new commodities.
- Establish short supply pipeline as achievable. Commodities that require to be used parallel to complete a testing procedure must be supplied simultaneously.
- Policy and regulatory matters linked to laboratory services should also be well thought-out while following laboratory logistics.
- Create collaborative course of action with national level workforce and policymakers to make certain with the aim of guidelines and policies are in place.

Acknowledgements:
The authors acknowledge the Dr. Khurram Shahzad from USAID | DELIVER PROJECT Pakistan to make this research possible by providing Valuable inputs.

References:


Prevalence and insecticide resistance status of malaria vectors in Talagang (Punjab), Pakistan

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Abstract

Background: Updated insecticide susceptibility status of malaria and dengue vector mosquito species is essential pre-requisite for strategic planning of vector prevention and control, especially where the use of chemical pesticides is the main methodology used for this purpose.

Methods: The recent information on insecticide resistance status in mosquito species in Pakistan has not been worked out. Therefore, determination of resistance status in these species forms the main objective of this study. Anopheline mosquitoes were collected in 2011 through field surveys from randomly selected areas of the Tehsil Talagang, found positive for the Anopheline species. The world Health Organization (WHO) susceptibility test kits were used for establishing resistance/susceptibility status. The survival/mortality data of tested insects was analyzed according to the WHO guideline and criterions for declaring resistance/susceptibility status.

Results: Six Anopheles species including primary malaria vectors An. culicifacies and An. stephensi were present in all tested localities. Maximum diversity was recorded in locality Balkasar (Simpson's index (D) of 0.270) and lowest was recorded at Jhatla (Simpson's index (D) of 0.324). Susceptibility test were conducted on only primary malaria vectors against two groups of insecticides Carbamates (Bendiocarb) and Pyrethroids (Lambdacyhalothrin). Both species were susceptible to Lambdacyhalothrin at all localities except Pira Fetehal and Balkasar where An. stephensi and An. culicifacies showed lower mortalities and were placed in verification required category.

Conclusion: The results of the study indicate presence of incipient resistance in both the species. It is expected that in these populations continued insecticide selection pressure may lead to high level of resistance, with serious implications on vector control. Therefore, a policy shift towards judicious and selective application pesticides and integrated vector management is recommended.

Key words: Anopheles, Susceptibility Status, Lambdacyhalothrin and Bendiocarb, Talagang. (Pak J Public Health 2013; 3(3): 31-34)

Introduction

Malaria is a major public health problem, in a number of the tropical and subtropical countries with high mortality in children (1, 2). Globally chemical pesticides are used for disease vector control in a number of ways, such as Indoor Residual Sprays (IRS), space sprays and for impregnation of bed nets and other materials (3, 4).

In Pakistan Chlorinated Hydrocarbons were initially used for malaria vector mosquito control which followed the use of Carbamates and organophosphates. But due to development of resistance to the above three groups of pesticides Pyrethroids were introduced for vector control and in 2003 the anopheles species were susceptible to Pyrethroids in province of Punjab (5). Notably the use of pyrethroids is on the increased globally (6). Previously in Pakistan DDT and Malathion resistance has been reported in malaria vectors from various districts of the Province of Punjab and Sind (7-10), but so far resistance to pyrethroids in malaria vector mosquitoes has not been reported from Talagang area.

It is known that a number of factors including environmental, socio-epidemiological, vector prevalence and insecticide resistance status may influence vector mosquito survival and consequently the malaria intensity, therefore, determination of latest status of insecticide resistance in vector species is essential for adopting appropriate strategies for insecticide resistance management and other vector control interventions (11). The Tehsil Talagang of district Chakwal has malaria problem, and the use of chemical pesticides is the main method of vector control. Vector bionomics and the recent status of insecticide resistance of malaria and dengue vector mosquitoes species in this district is not been documented so far. The present study was aimed...
at determination of prevalence of malaria vector and their status of susceptibility / resistance to pyrethroid Lambdacyhalothrin and the carbamate Bendiocarb which being used for various public health purposes. The results of this study shall contribute towards drawing a complete picture of insecticide resistance in malaria vector mosquitoes and strategic planning for safe and judicious use of pesticides in the Province of Punjab.

**Methods**

**Collection and Identification:** Surveys were conducted to collect mosquitoes from animal sheds and human dwellings in the peak density season i.e. post monsoon (August to October) in 2010 from different localities of Tehsil Talagang. Seven localities were identified i.e. Thoa Mahram Khan, Pira Fatehal, Jhatla, Malakwal, Talagang, Dharabi, Balkasar; collections were made on weekly basis from these localities in early morning by using mouth aspirator and CDC sweeper. All collected specimens were identified up to species level under binocular microscope by using Taxonomic keys of Christopher (12) and Barraud (13).

**Insecticide Susceptibility Test:** The susceptibility test was conducted using WHO test kits and insecticide impregnated papers and the guidelines. Three replicates of female mosquitoes (15 in each test tube) were exposed at the diagnostic dose of Bendiocarb 0.1% and Lambdacyhalothrin 0.05%.

Appropriate controls were run in all cases. Normally there were no mortalities in the controls but in cases where 5-20 % mortalities were observed in controls, corrected percentage mortalities were calculated using Abbott's formula as follows:

\[
\text{Abbott's formula} = \frac{(\% \text{ Test mortality} - \% \text{ Control mortality})}{(100 - \% \text{ Control mortality})} \times 100
\]

The percentage of mortalities was calculated and used to establish susceptible and resistant status of tested populations. Interpretations of the susceptibility tests were based upon the following arbitrary criteria (14). 

- Susceptible (S) = 98-100%
- Verification Required (?) = 90-97%
- Resistance (R) > 90%

**Diversity Index:** Diversity index was calculated to find out the distribution and breeding potential of collected species in the selected areas.

Simpson's index (D), The Simpson's Index of Diversity (1 - D) and Simpson's Reciprocal Index (1/D) were calculated by using the formula $D = \frac{\sum n}{n(n - 1)}$, $\frac{1}{D} = \frac{n}{\sum n}$, and $1/D = n \times (\sum n - n)$ respectively.

**RESULTS**

A total of six Anopheles species *Anopheles stephensi*, *An. culicifacies*, *An. subpictus*, *An. fluviatilis*, *An. annularis* and *An. pulcherimus* were recorded. The two primary malaria vector species *An. stephensi* and *An. culicifacies* were present in all the surveyed localities and both the species were most abundant as compared to other Anopheline species as shown in Fig. 1. Results show that in Tehsil Talagang breeding conditions are most suitable for vector species. The diversity index of Anopheles species in different localities is shown in Fig. 2.

**Fig 1:** Anopheles species composition recorded from different localities of Tehsil Talagang

**Fig 2:** Simpson's Index, Simpson's Diversity index and Simpson's Reciprocal index of Anopheles species from different localities of Tehsil Talagang.

The values showing the maximum diversity of species in locality.
The maximum diversity was in Balkasar with Simpson's Index (D) 0.270, followed by Thoa Mahram Khan, Talagang, Dharabi, Malakwal, Pira Fatehal and Jhalla with 0.276, 0.287, 0.296, 0.303, 0.316 and 0.324 respectively, other related value like Simpson's Index of Diversity (1-D) and Simpson's Reciprocal Index (1/D) were also calculated all these value supported the diversity sequence as mentioned above. Susceptibility test results on An. stephensi and An. culicifacies against diagnostic doses of Lambdacyhalothrin are shown in Table 1 and against Bendiocarb shown in Table 2.

<table>
<thead>
<tr>
<th>Table 1: Susceptibility/resistance status of Anopheles against Lambdacyhalothrin 0.05%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locality</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Thoa Mahram Khan</td>
</tr>
<tr>
<td>Malekhel</td>
</tr>
<tr>
<td>Pira Fatehal</td>
</tr>
<tr>
<td>Jhalla</td>
</tr>
<tr>
<td>Dharabi</td>
</tr>
<tr>
<td>Balkasar</td>
</tr>
</tbody>
</table>

? = Verification Required, S = Susceptible

<table>
<thead>
<tr>
<th>Table 2: Susceptibility/resistance status of Anopheles against Bendiocarb 0.1%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locality</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Thoa Mahram Khan</td>
</tr>
<tr>
<td>Malekhel</td>
</tr>
<tr>
<td>Pira Fatehal</td>
</tr>
<tr>
<td>Jhalla</td>
</tr>
<tr>
<td>Dharabi</td>
</tr>
<tr>
<td>Balkasar</td>
</tr>
</tbody>
</table>

? = Verification Required, S = Susceptible

Discussion
Interestingly, in the neighboring country Iran both An. culicifacies & An. stephensi have been observed to have similar susceptibility pattern, in Iranian strains both the species were tested against different chemical at three different localities, An. stephensi showed 98.5 + 1.4% mortality against Bendiocarb at Gavdary, against Lambdacyhalothrin it showed 96.7+1.78 at Gavdary, 100% at Abtar, while An. culicifacies showed 100% mortality at Ghasserghand (16).

In another study on An. culicifacies, Bendiocarb showed 98.86 + 0.7% mortality and Lambdacyhalothrin showed 100% mortality (17), similarly susceptible results of Lambdacyhalothrin was shown on An. stephensi in Iran (18).

The present study indicates possibilities of development of high level of resistance in these species if indiscriminate application of bendiocarb and Lambdacyhalothrin is continued for public health or agricultural purposes. These results indicate the need for application of appropriate resistance management strategies in order to avoid development of higher levels of resistance leading to control failure.

Conclusion:
The results of the study indicate presence of incipient resistance in both the species. It is expected that in these populations continued insecticide selection pressure may lead to high level of resistance, with serious implications on vector control. Therefore, a policy may be shifted towards judicious and selective application pesticides and integrated vector management.

Acknowledgments
Our Sincere thanks to Health Services Academy, Islamabad for providing us funds and opportunity to perform the research. We are also thankful to whole the team of MEDVC for their involvement and support throughout the study.

References


Incentives scheme can be both beneficial & counterproductive: A systematic review of efficacy and values of health workers' incentives in health sector

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Abstract

Background: Human resource for health is believed to be an important factor of health system. Pakistan is the country who is facing big challenge of health workers migration and shortage of health staff. Incentives known to be important interventions while in better management and retention of health work force in any country. Incentive is required to retain capable, fascinated, and motivated health workforce in order to develop a health system reactive to the requirements of the target population. During this systematic review the evidence on efficacy and value of Incentives for health workers were analyzed.

Methods: During this secondary review, 10,626 articles were accessed and finally 22 articles were included for the analysis according to the study objectives rest was excluded. WHO database, Global Health Worker Alliance, CINAHL and SCOPUS and Pub Med in addition to by internet search engine Google were accessed during this secondary review.

Results: 22 published papers were analyzed shows that incentives in form of improved salaries, perks, benefits, trainings, promotions, supervisions, work environment, good relationship, autonomy during their job, communication, performance based benefits and opportunities were found significant in the retention of health workers working in health sectors of different developed and developing countries.

Conclusions: Review concludes that the incentives for health professionals have positives impacts on the retention of Human resources for health in any organization.

Keywords: HRH, health incentives, motivation, work force performance financial incentives and non-financial incentives. (Pak J Public Health 2013; 3(3): 35-40)

Introduction

Incentives are anticipated to change the way in which people act and facilitate organizations to be a focus for member of staff for particular jobs and retain the workers (1). In various geographic regions, both in developing and in developed countries, the number of health workers is inadequate to attain population health goals. Human Resources for Health (HRH) projected that "Sub-Saharan countries must nearly triple their existing numbers of workers by accumulating the equivalent of one million workers by retention, enrollment, and training because they are to come close to approaching the Millennium Development Goals for health (2).

Health workforce is most important core component responsible for efficient use of all resources. Globally about 60 million health workers are taking part in the betterment of the human health, hitherto there is dearth of 4.3 million workers; amid them are 2.4 million doctors, nurses and midwives. Existing distribution of health workers is uneven within and among different countries and regions. Their employment is least in areas where they are badly needed. Recession of economy globally, working conditions are not safe and poor skill mix are other main issues. Pakistan is one of the 57 countries having workforce fewer than least requirement of 2.28 health professionals/1000 population. It is imperative to note that non-fiscal incentives having as much value as the financial ones and both need to be linked jointly (3).

Incentive systems usually depend on some straightforward models of human conduct. They characteristically suppose that individuals and groups are motivated by wishes to acquire prize and keep away from penalties (4). Incentives are required to retain capable, fascinated, and motivated health workforce in order to develop a health system reactive to the
requirements of the target population. Interventions anticipated to reduce health worker scarcity embrace careful enrollment and preparation for put into practice, enhancement in working or living circumstances, crucial service or incentives (5). However, in Pakistani health system only limited literature is available on the benefits of incentives for retention of HRH. During this systematic review the evidence on efficacy and value of incentives for health workers were analyzed.

**Methods**

Many sources were used for the collection of secondary data that comprise of materials on incentives and human resources such as WHO database, Global Health Worker Alliance, CINAHL and SCOPUS and Pub Med in addition to internet search engine Google were accessed during this secondary review. Unpublished data in the shape of lectures at Health Services Academy was also explored to construct conclusion about incentive

**Figure1: Flow chart of systematic review**
## Results

<table>
<thead>
<tr>
<th>S.No</th>
<th>STUDY</th>
<th>SETTING</th>
<th>STUDY DESIGN</th>
<th>SAMPLE SIZE</th>
<th>INTERVENTION (INCENTIVE)</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Touré, 2010</td>
<td>Africa</td>
<td>Review</td>
<td>--</td>
<td>Performance based pay</td>
<td>Low salaried scenarios</td>
</tr>
<tr>
<td>2</td>
<td>Yip, 2010</td>
<td>China</td>
<td>Review</td>
<td>--</td>
<td>fee-for-service payment system</td>
<td>Inefficiencies, poor-quality health care &amp; affordable quality health care</td>
</tr>
<tr>
<td>3</td>
<td>Ssengoa, 2010</td>
<td>Uganda</td>
<td>RCT</td>
<td>68:52</td>
<td>Performance based contracting</td>
<td>Ineffective bonus on hospital performance</td>
</tr>
<tr>
<td>4</td>
<td>Soeters et al., 2006</td>
<td>Rwanda</td>
<td>Survey cross-sectional</td>
<td>560</td>
<td>Performance based financing</td>
<td>Performance-based financing, financial accessibility &amp; motivation of health staff</td>
</tr>
<tr>
<td>5</td>
<td>Kingma, 2003</td>
<td>London and Geneva</td>
<td>Exploratory study</td>
<td>95</td>
<td>Financial and career development</td>
<td>Better salary, Financial rewards and career development opportunities</td>
</tr>
<tr>
<td>6</td>
<td>Ndeti, et al., 2008</td>
<td>Kenya</td>
<td>Coss-sectional survey, Key informants, meta analysis</td>
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<td>Financial and non financial incentives</td>
<td>Improved working conditions, training, supervision, and good living conditions</td>
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<td>Performance based payment bonuses</td>
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<td>USA</td>
<td>Brief</td>
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<td>Pay for performance</td>
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<td>Exploratory Study</td>
<td>152</td>
<td>Non-financial incentives and the retention of health workers in Tanzania</td>
<td>Fair promotion system, training, supportive supervision</td>
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systems. Search theme in general, considered necessary documents referring to incentives in health sector, motivation, work force performance financial incentives and non-financial incentives were used to explore the literature available in developed and under-developed countries both were observed. Documents were downloaded, examined for replication, vetted and were arranged according to the objectives. Accordingly 10,626 articles were accessed and finally 22 articles were included for the analysis according to the study objectives rest was excluded (fig.1).

Discussion

**Benefits of Incentives:** Studies assessed the worth of health care production and motivation of employees by giving those incentives. Performance-based financing scheme showed good results regarding use of services, financial ease of access and inspiration of health workers in addition to in the assimilation of the private sector (6). In the course of a mixed qualitative and quantitative study show that comprehensible job descriptions, trainings, community awareness and better working environment are promoters for good work (7). Considered that the incentives facilitate a lot in doctor’s retention in the rural areas of Zambia by giving them suffering allowance, post graduate training opportunities and finance for purchase of cars. Bonuses, payment, performance pay, and contracting out of services enhanced health service utilization indicators (8). A qualitative study deduced that non fiscal incentives besides other actions of proper human resource management facilitate to inspire health care providers (9). Study also concluded that performance could be better by Incentives which encourage health worker and better job satisfaction helped in retaining jobs (10). Another study shows that competitive salary was come across very important inspiring feature for performance of nurses (11). A study in Kenya deduced that superior working environment, education and supervision, excellent accommodation, transport, health care and educational opportunities for themselves and their families are some of the most significant and highly esteemed incentives by the health workers (12). Payment based on the performance in the health sector is generally taken as a component of health sector reforms (13). Low income countries did not construct any consensus on a cohesive model yet; but proof from developing countries such as Cambodia, Afghanistan, and Haiti propose that performance based financing can enhance health service delivery more fruitfully than conventional input based financing system. Mixed qualitative and quantitative study that retention of health workforce was optimistically related with job

| 17 | Outmide, 2008 | Nigeria | Discussion paper | -- | Addressing the human resource challenges in Nigeria | Job-descriptions, codes of conduct, matching tasks with skills, supportive supervision & supervision |
| 18 | Parmelli E. et al. 2011 | global | Cochrane Review | 4239 records | The effectiveness of strategies to change organizational culture | Scientific evidence of strategies is lacking |
| 19 | Loevinsohn, 2005 | Afghanistan | Review of ten contracting studies | 10 | Contracting for health services | In six out of ten studies contracting was successful as compared to Govt. |
| 20 | Gross et al., 2010 | Kenya | Analysis of Health database of Kenya | -- | Impact of emergency hiring plan on the shortage & distribution of nurses in Kenya | Emergency hiring plan with financial incentives significantly increased number of nurses in remote areas |
| 21 | O’Neil et. al., 2010 | Malawi | Evaluation of Malawi’s Emergency Human Resources Programme | -- | Impact of contracting, top ups, hardship allowances on health work force | Significantly contributed to stabilization of system but need to be sustained with policy reforms, budgetary support, and pre service training programs. |
| 22 | Boyne and Hood, 2010 | UK | Symposium on incentives | -- | Financial, legal and political incentive system in UK | Financial incentives are most important but at this time of financial bust. Need is urgent to look into other types of incentives namely legal and political. |
contentment which was improved in the course of encouraging administration, admiration of health staff and valuing them, linking them in decision making, and help them for professional development (14). Striking salary package, free furnished lodging, transport, and job to spouse through Maternal, Neonatal, and Child Health Program for the health staff has been a major attraction for health workers to retain in the most remote area of Azad Jammu and Kashmir (15).

Incentives with their Counterproductive Effects:
Study stated that incentives could be destructive and inappropriate incompetence, excessive health practices and wearing down of medical ethics have been seen when fee-for-service payment system has been applied (16). Fiscal rewards cannot resolve all worker motivation issues although they are important determinants of the drive for health workers (17). Similarly, the bonuses given to the hospital employee had been unproductive. However, harmful effects have been deducted on organizational performance (18). Other study concluded that the services might be affected when the staff was not getting the market based competitive benefits (3). In the same way negative effects of 'scarce skill allowance' have been confirmed in those workers enrolled but not included due to eligibility. The adverse effects of insertion of only a few cadres in the incentive schemes were emphasized the health team approach for execution of incentives scheme (19). Hence, it was found that there was lesser productivity seen due to split of health workers in low and high paid categories in the same units were reported (20). It was proved that non-financial incentives are known to be an important factor for Community Health Worker retention, association with the community, health staff appreciation, personal development and development opportunities (21). In another study there was no any convincing evidence have been found during Cochrane review of 4,239 articles of usefulness of changing beliefs, norms, behavior, routines and traditions in an organization on enhancement of health outcomes (22). If supervision is penalizing and critical, it will have unhelpful results on the health care delivery system. On the contrary, supervision that is encouraging, educative, and steady, can enhance performance, job satisfaction and stimulus (3). To obtain incentives, events of opportunism and manipulation of data by health workers have been concluded. The capacity problems linked to the criterion for appraisal of physician efficiency in conjunction with option of careful inclusion of patients to fulfill quality standards and manipulation the system for showing outcome (23).

Conclusions:
Mixed outcomes have been shown for the impact of incentives for attracting, inspiring and retaining health professionals, on their output, and value of outcomes. Literature is scarce on precise studies which are focusing on results of incentives. In the existing setting of global shortage of health workforce with unbalanced division and brain drain to high income countries, it is vital to study and work out in dialogue with stake holders, and execute packages of incentives especially for developing/under developed countries. Moreover we can interpret it safely that incentive if deal with reflection of local context and need of health workers can optimistically add to the health workers output, their preservation, and inspiration. Added meticulous and illicit researches are requisite for decisive proof support regarding helpfulness of incentives.

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8. Prado AG, Pena CL. Contracting and Providing Basic Health Care Services in Honduras: A


Point Survey: Ento-Epidemiological Investigations of Dengue Outbreak in Swat, KPK
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Summary:
The incidence of dengue fever (DF) and dengue hemorrhagic fever (DHF) continue to grow globally. Today, dengue is the most important mosquito-borne viral disease affecting humans, with Aedes aegypti and Aedes albopictus as the mosquito vector for the dengue viruses, found in nearly 100 tropical countries. Global distribution of dengue is comparable to that of malaria, and an estimated 2.5 billion people live in areas at risk for epidemic transmission. The Entomological Point Survey of Dengue vector in Dengue Epidemic Area of swat was conducted by Department of Medical Entomology and Disease Vector Control (MEDVC), Health Services Academy, Islamabad on the request of Health Authorities Swat. In Mangora at random 20 houses were searched for the dengue vector and all 20 were found positive. A total number of 103 containers were searched and all 103 found positive of the Aedes Larvae. The House index (HI), Container index (CI), Breteau index (BI) and Pupal Index (PI) was calculated as 100, 100, 515 and 600 respectively.

Key words: Ento-epidemiological, Surveillance, Dengue, Swat. (Pak J Public Health 2013; 3(3): 41-43)

Outbreak Report:
The incidence of dengue fever (DF) and dengue hemorrhagic fever (DHF) continue to grow globally. Today, dengue is the most important mosquito-borne viral disease affecting humans, with Aedes aegypti and Aedes albopictus as the mosquito vector for the dengue viruses, found in nearly 100 tropical countries. Global distribution of dengue is comparable to that of malaria, and an estimated 2.5 billion people live in areas at risk for epidemic transmission. In world about 50 million dengue cases occur annually and 2.5 billion people live in dengue endemic countries (1). The World Health Assembly (WHA) resolution 55.17 (2) urged greater commitments to dengue by WHO and its Member States. In 2005 WHA adopted resolution 58.3 on the revision of International Health Regulations (IHR) (3). This resolution includes dengue as an example of a disease that may constitute a public health emergency of international concern with implications for health security due to disruption and rapid spread of epidemic beyond national borders. Eastern Mediterranean Region (EMR) dengue Outbreaks have been documented since 1799 from Egypt (4).

Dengue fever (DF) is endemic in Pakistan with annual seasonal outbreaks observed every year. The country witnessed a major outbreak of dengue fever in 2011. Punjab was the worst affected province with over 250,000 suspected cases including 219 deaths reported from this outbreak in 2011 (Table-1). Although dengue fever outbreaks have been reported cyclically in Pakistan, since 1994, one of the major striking features of this year's trend is that DF cases have been reported from areas that do not fall in the traditional endemic belt of the country. Laboratory-confirmed cases of DF were reported from KPK (District-Swat) and Baluchistan province (District-Gwadar) that were not known endemic foci for DF in Pakistan. Laboratory tests have detected DEN-1, DEN-2 and DEN-3 serotypes from the recently reported cases. The expansion of the disease geographically to newer areas is probably due to the spread of competent mosquito vectors to newer geographic range. As a result, the recent trend of dengue fever disease in Pakistan is a sign of vector expansion to newer areas.

An outbreak of dengue fever has been reported in Swat district of Khyber Pakhtunkhwa (KPK) province in Pakistan. As of 25 September 2013, a total of 6376 suspected cases, including 23 deaths (case–fatality rate 0.36%), were reported from this district since 7 August 2013. Laboratory test performed at the National Institute of Health (NIH) in Islamabad, Pakistan, confirmed the diagnosis and detected three sero types of dengue fever (DEN-1, DEN-2 and DEN-3) as the causative strain of this current outbreak.
The research team from Department of Medical Entomology and Disease vector control conducts a 2 day survey for Ento-Epidemiological Investigations of Dengue outbreak in Swat KPK.

The valley of Swat is situated in the north of Khyber Pakhtunkhwa, 35° north latitude and 72° and 30° east longitude, and is enclosed by the mountains. Chitral and Gilgit Baltistan are situated in the north, Dir in the west, and Mardan in the south. The Indus River separates it from Hazara in the east. Physical features: Swat can be divided into two physical regions mountains and plains.

The Entomological Point Survey of Dengue vector in Dengue Epidemic Area was conducted by Department of Medical Entomology and Disease Vector Control, Health Services Academy, Islamabad on the request of Health Authorities of Swat.

Discussions with health authorities and Exchange of information of disease epidemiology were carried out at District Health Office Mangora Swat. During the discussion it was clearly indicated that the health authorities lack experience in dealing with such epidemic. During the visit it was also become evident that expertise on Medical Entomology and Disease Vector Control was lacking. However some of the under training MEDVC students from KPK was providing the technical support to health department on voluntary bases. The Entomological surveillance of Dengue vector was carried out in Mangora District Swat, KPK. In Mangora at random 20 houses were searched for the dengue vector and all 20 were found positive. A total number of 103 containers were searched and all 103 found positive of the Aedes Larvae. The House index (HI), Container index (CI), Breteau index (BI) and Pupal Index (PI) was calculated as 100, 100, 515 and 600 respectively as mentioned in Table (2).

The maximum positivity of Aedes larvae was recorded in partially uncovered underground cemented tanks and in Plastic /metallic Drums. However, breeding was also observed in discarded containers, earthen pots, Buckets Tins and jars. It was also observed that water cemented tanks

![Map showing the areas where Aedes aegypti Larval and adult survey was conducted in Mangora, District Swat, KPK (Prevalence indeces (%) of Aedes aegypti in Mangora. HI= 100, BI= 100, CI=515 and PI=600 were recorded).](image)

Table 1: Dengue fever cases reported from Pakistan, 2006–2011 (Source WHO)

<table>
<thead>
<tr>
<th>Year</th>
<th>Suspected cases</th>
<th>Cases laboratory confirmed</th>
<th>Deaths</th>
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<tr>
<td>2006</td>
<td>4961</td>
<td>1931</td>
<td>41</td>
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<tr>
<td>2007</td>
<td>2304</td>
<td>1226</td>
<td>18</td>
</tr>
<tr>
<td>2008</td>
<td>2792</td>
<td>2469</td>
<td>17</td>
</tr>
<tr>
<td>2009</td>
<td>1940</td>
<td>1085</td>
<td>13</td>
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<tr>
<td>2010</td>
<td>15 901</td>
<td>11 024</td>
<td>40</td>
</tr>
<tr>
<td>2011</td>
<td>252 935</td>
<td>17 057</td>
<td>219</td>
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</tbody>
</table>
were the preferred breeding habitats. These tanks, are constructed underground partially covered rarely cleaned and remain undisturbed most of the time, thus resulting in high breeding of Aedes mosquitoes.

From the present entomological investigations, it can be concluded that Ae. aegypti is well-established within the different localities of Mangora, with most of the surveyed villages showing high larval indices which may be the probable reason for sudden spurt of dengue in this area. Aedes breeding indices have been recorded above the critical levels imply their potential for future outbreaks. This is mainly attributed to change in ecology, cultural and social behavior of population, life style changes, non-availability of tap water supply enforcing water storage in containers etc. The reporting of dengue and high density of dengue vectors might be due to rise in temperature making it favorable for transmission of dengue. Therefore, in order to contain the occurrence of DHF/DF, entomological surveillance should be undertaken effectively in the known endemic localities and the information should be utilized to forecast the possibility of future outbreaks of DHF/DF, so that necessary control measures could be undertaken to avoid any dengue outbreak in future.

Stringent measures such as integrated vector management, minimizing the breeding potential of Ae. aegypti by adopting one day bottom up programme, water management practice by individuals along with implementation of IEC activities are suggested to contain epidemics in future.

Conclusions:
The prevention and control of vector-borne diseases especially Dengue is beset with many challenges. Although the health sector will continue to focus more on disease control activities, yet containment of vector-borne diseases requires active support and commitment of multi-sectorial partners to obviate the conditions and factors that promote and facilitate increase in disease vector populations. Collective and continued interest of high level political will and active participation of policy and decision makers at national level as well as strong inputs from national and international technical and funding agencies are prerequisites for sustained prevention and control of disease vectors and intermediate hosts of disease.

References:


Table 2: Prevalence indices of Aedes spp in different localities of Mangora, Swat

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<tr>
<th>Locality</th>
<th>No. of houses visited</th>
<th>No. of houses found positive</th>
<th>No. of containers searched</th>
<th>No. of containers found positive</th>
<th>No. of pupae collected</th>
<th>HI (%)</th>
<th>CI (%)</th>
<th>BI (%)</th>
<th>PI (%)</th>
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<tr>
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<td>20</td>
<td>20</td>
<td>103</td>
<td>103</td>
<td>120</td>
<td>100</td>
<td>100</td>
<td>515</td>
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