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Abayomi (2000), Agindotan et al. (2003), (Kelebeni,

1987a,b; Tijani, 1993,1995), (Kumasi et al., 2001)

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Chikere CB, Omoni VT and Chikere BO (2008). Distribution of potential nosocomial pathogens in a hospital environment. *Afr. J. Biotechnol.* 7: 3535-3539.

Moran GJ, Amii RN, Abrahamian FM, Talan DA (2005). Methicillinresistant *Staphylococcus aureus* in community-acquired skin infections. *Emerg. Infect. Dis.* 11: 928-930.

Pitout JDD, Church DL, Gregson DB, Chow BL, McCracken M, Mulvey M, Laupland KB (2007). Molecular epidemiology of CTXM-producing *Escherichia coli* in the Calgary Health Region: emergence of CTX-M-15-producing isolates. *Antimicrob. Agents Chemother.* 51: 1281-1286.

Pelczar JR, Harley JP, Klein DA (1993). *Microbiology: Concepts and Applications.* McGraw-Hill Inc., New York, pp. 591-603.

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Association between O blood group and *Helicobacter pylori* infection: A systematic review and meta-analysis

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Helicobacter pylori (*H. pylori*) infection is associated with several diseases including gastritis, gastric ulcer, pancreatic cancer and iron deficiency anemia. Different epidemiological studies reported controversial findings on the association between O blood group and *H. pylori* infection. This meta-analysis was conducted to verify the association between *H. pylori* infection and O blood group. Random-effects model was used to pool data on the association between *H. pylori* infection and O blood group in 18 selected studies. DerSimonian Liard statistic was used to estimate the effect size. Stability of the pooled estimates was assessed by sensitivity analysis. Publication bias was assessed by using funnel plot and Egger's test. Fourteen of the 18 included studies reported no significant association between *H. pylori* infection and O blood group. Among ten reviewed studies which were conducted among dyspeptic patients, four showed statistically significant association. However, none of six studies conducted among asymptomatic patients demonstrated statistically significant association. The pooled effect size showed no statistically significant association between O blood group and *H. pylori* infection (odds ratio (OR) = 1.18, 95% CI [0.95, 1.48]). However, the pooled effect size under stratified meta-analysis turned to be statistical significant among studies conducted in dyspeptic patients (OR = 1.44; 95% CI [1.03, 2.01]). The analysis did not show statistically significant association between *H. pylori* infection and O blood group among all study participants. However, statistically significant association between *H. pylori* infection and O blood group was observed in a subset of studies conducted among dyspeptic patients. Caution should be made while interpreting the finding as the severity of dyspepsia is not standardized and different *H. pylori* strains were not taken into account.

Key words: *Helicobacter pylori*, ABO blood group, O blood group, meta-analysis.

INTRODUCTION

Helicobacter pylori (*H. pylori*) is a gram-negative bacillus that regularly colonizes the human stomach (Passaro et al., 2002; Sasidharan et al., 2010). It is present in 20 to 50% of the population in developed countries and 80% of

the population in developing countries (Wen et al., 2007). *H. pylori* causes considerable morbidity and mortality worldwide. Many recent studies have revealed that *H. pylori* infection is associated with several diseases

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including iron deficiency anemia (Wang et al., 2012), pancreatic cancer (Risch et al., 2010), gastritis, gastric ulceration and gastric cancer (Atherton et al., 1996). These different health outcomes have interested different researchers to investigate risk factors associated with *H. pylori* infection. To this end, several studies were conducted to establish a relationship between *H. pylori* infection and the ABO blood groups. However, the findings of different epidemiological studies reported on the association between O blood group and *H. pylori* infection were controversial and inconsistent.

While many authors reported statistically significant association between O blood group and *H. pylori* infection (Jaff, 2011; Mattos et al., 2010; Mattos et al., 2002), many others failed to establish such an association (Rasmi et al., 2011; Moges et al., 2006; Tadege et al., 2005; Zhub et al., 2011). Sample size, studied population and tests used to detect *H. pylori* infection were cited to be the source of variation in the findings of different studies which investigated the association between ABO blood group and *H. pylori* infection.

The aim of this meta-analysis is therefore to verify the association between O blood group and *H. pylori* infection by increasing the numbers of observations and the statistical power.

Literature search

MEDLINE, PubMed and google scholar were systematically searched without date restrictions in August, 2013. Our search was limited to articles published in English language. Medical subject heading terms (MeSH) was used as a combination of *H. pylori* and ABO blood groups. Articles cited in the retrieved articles were searched online to supplement the search. The study did not involve any contact with authors. Unpublished works were not included in this meta-analysis.

Study selection

All studies that assessed an association between ABO blood group and *H. pylori* infection were included, irrespective of the presence or absence of statistically significant association. We excluded studies which reported association between other blood groups other than ABO and *H. pylori* infection. Studies with, as well as those without a control group were included. Only full length articles were included in the analysis. Two reviewers: DS (Epidemiologist) and DD (Medical Microbiologist) independently assessed the eligibility of articles. Only studies which excluded study participants

who had been receiving treatment for *H. pylori* infection were included in this meta-analysis.

Data extraction

The two researchers completed the data extraction using a standardized spread sheet that collected information on the first author, year of publication, study design, study population (symptomatic versus asymptomatic), country (developed versus developing), frequency of infection by ABO blood group and mean age. Disagreement between reviewers occurred only on one study and was resolved through discussion to achieve consensus.

Data analysis

Extracted data from the selected studies were entered and analyzed using stata 12, College Station, TX 77 845, USA. The original studies was described using frequency and forest plot. Two measures of heterogeneity: chi-squared test of heterogeneity and I^2 were used to assess between studies heterogeneity. A chi-squared value with a p-value < 0.05 and I^2 value > 40% were used to quantify heterogeneity between studies (Crowther et al., 2010). The selected studies had substantial heterogeneity with heterogeneity chi-squared value = 58.6, df (16) and p-value = 0.0001 and I^2 value = 64.2%. As a result, random-effects model was used. A pooled estimate of the odds ratio comparing O blood group to non O blood groups for *H. pylori* infection was calculated using random-effects model. DerSimonian Liard statistics was used to estimate the effect size. To account for the observed heterogeneity we employed stratified meta-analysis by different study characteristics such as study population (dyspeptic, asymptomatic) and source continent. Finally, sensitivity analysis was conducted to determine whether the pooled results were robust. Individual studies were removed and their effect on the overall effect size evaluated. Removal of a study by Jaff (2011) (weight: 8.9%) changed the statistically significant pooled effect size for dyspeptic study population not to attain statistical significance. However, the study was retained in the final analysis for its higher quality and larger sample size. Funnel plot and egger's test were used to assess publication bias.

RESULTS

Study selection

The literature search identified 258 studies, of which 191 were excluded after reviewing the topic and abstracts. Further 49 articles were excluded after reviewing full

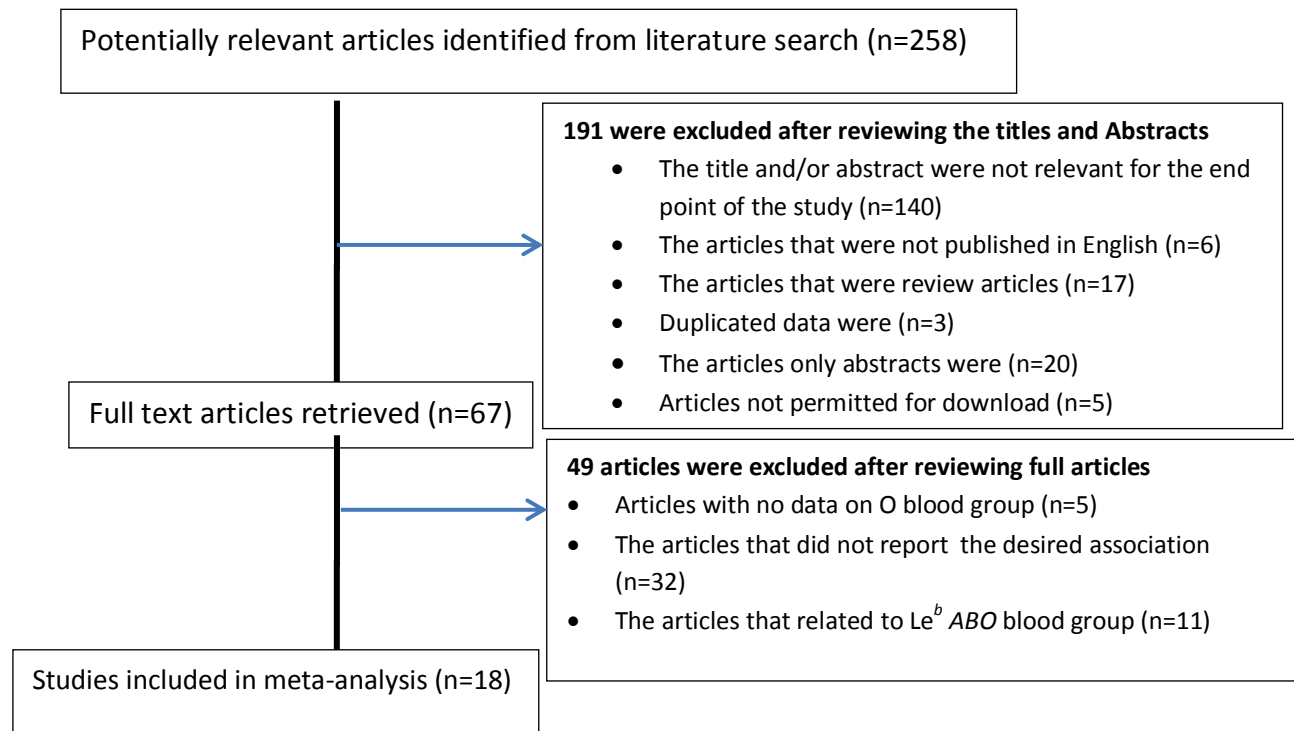


Figure 1. Schematic presentation of study selection process.

length articles. Hence, complete information could be extracted from a total of 18 eligible studies (Figure 1).

Description of original studies

Of the 18 observational studies included in the analysis, three were from Africa (Nwodo et al., 2009; Moges et al., 2006; Tadege et al., 2005), eight were from Asia (Rasmi et al., 2011; Wu et al., 2003; Romshoo et al., 1997; Valliani et al., 2013; Aryana et al., 2013; Jafarzadeh et al., 2007; Jaff, 2011), five were from Europe (Loffeld and Stobberingh, 1991; Petrovic et al., 2011; Zhub et al., 2011; Heneghan et al., 1998; Lopes et al., 2013) and two were from Latin America (Mattos et al., 2002; Mattos et al., 2010). This meta-analysis is computed on a total sample of 5,036 study participants from the selected 18 studies. The sample size ranged from 80 in Kashmir, India (Romshoo et al., 1997) to 1108 in Iraq, Asia (Jaff, 2011). The studies included in the analysis were cross-sectional in design (Tables 1 and 2).

Ten of the included studies were conducted among dyspeptic patients and six studies among asymptomatic study participants (Table 1). In 11 of the included studies, *H. pylori* infection was diagnosed by an ELISA test. The sample size and particularly the number of study

participants with O blood group in each included studies is generally low (Table 1).

Pooled effect-size

The estimates of the specific studies showed positive association between O blood group and *H. pylori* infection in four of the included studies. However, in the rest majority of the included studies, 14 (77.7%), no statistically significant association was demonstrated between O blood group and *H. pylori* infection (Figure 2). Among ten reviewed studies which were conducted among dyspeptic patients, four showed statistically significant association. However, none of six studies conducted among asymptomatic patients demonstrated statistically significant association. The selected studies had substantial heterogeneity with heterogeneity chi-squared value = 58.6, df (16) and p-value = 0.0001 and I^2 value = 64.2%. As a result, random-effects model was used. Based on the random effects model, the overall pooled estimate failed to show statistically significant association between O blood group and *H. pylori* infection, DerSimonian Liard pooled OR = 1.18, 95% CI [0.95, 1.48]. The specific and pooled estimates are presented in the forest plot (Figure 2).

Table 1. Description of studies included in the analysis, 2013.

Author, Publication year	Country	Study population	Diagnosis	Population	Sample Size	<i>H. pylori</i> Infected	O Blood group
Tadege et al. (2005)	Ethiopia	Both**	ELISA	Child	200	124	86
Romshoo et al. (1997)	Kashmir	Both**	Biopsy	Adult	80	48	37
Loffeld et al. (1991)	Netherland	Asymptomatic	ELISA	Adult	402	143	176
Jaff et al. (2011)	Iraq	Dyspeptic	ELISA	Adult	1108	718	423
Mattos et al. (2010)	Brazil	Dyspeptic	PCR	Adult	110	73	63
Rasmi et al. (2011)	Iran	Asymptomatic	ELISA	Adult	151	98	8
Aryana et al. (2013)	Iran	Dyspeptic	UBT	Adult	135	68	51
Lopes et al. (2013)	Coimbra	Dyspeptic	*	Adult	114	76	55
Petrovic et al. (2011)	Serbia	Dyspeptic	UBT	Adult	227	93	69
Heneghan et al. (1998)	Ireland	Dyspeptic	ELISA	Adult	198	90	110
Zuhubi et al. (2011)	Kosovo	Asymptomatic	ELISA	Adult	671	382	298
Jafarzadeh et al. (2007)	Iran	Asymptomatic	ELISA	Child	386	180	166
Valliani et al. (2013)	Pakistan	Dyspeptic	Biopsy	Adult	93	36	41
Keramati et al. (2012)	Iran	Asymptomatic	ELISA	Adult	171	131	63
Moges et al. (2006)	Ethiopia	Dyspeptic	ELISA	Adult	215	184	90
Nwodo et al. (2009)	Nigeria	Dyspeptic	ELISA	Adult	225	181	109
deMattos et al. (2002)	Brazil	Dyspeptic	PCR	Adult	125	74	53
Wu et al. (2003)	China	Asymptomatic	ELISA	Adult	425	124	206

*Chemiluminescent, UBT: urea breath test, ** asymptomatic and symptomatic

Table 2. Sample size of included studies by continent, 2013.

Continent	Sample size	Percent (%)
Africa	640	12.7
Asia	2549	50.6
Europe	1612	32
Latin America	235	4.7
Total	5036	100

Stratum-specific effect size

Because there was substantial heterogeneity between included studies, we employed stratified meta-analysis taking study population (symptomatic, asymptomatic or both), continent and type of country (developing versus developed) as stratifying variables. Across all the strata, the heterogeneity statistic (I^2) varied substantially. Accordingly, we used fixed-effects model when I^2 for a given stratum is less than 40% and p -value greater than 0.05 and random-effects model otherwise (Table 3). The pooled estimate under the stratified analysis showed statistically significant association between O blood group and *H. pylori* infection when the study subjects were symptomatic (dyspeptic), OR = 1.44; 95% CI (1.03, 2.01) (Figure 3 and Table 3) and in studies conducted in Latin America, 3.45; 95% CI (1.94, 6.12). There was no

statistically significant association between O blood group and *H. pylori* infection among asymptomatic patients. Similarly, subgroup analysis by continent showed no statistically significant association between O blood group and *H. pylori* in studies conducted in Africa, Asia and Europe (Table 3). Publication bias was assessed using funnel plot and Egger's test. The findings from an Egger's test (Coef. 0.69, standard error = 0.95 and p -value = 0.45) revealed no significant asymmetry, suggesting no publication bias.

DISCUSSION

This meta-analysis was performed primarily to reconcile the inconsistencies observed between many previous investigations. Unlike many observational studies (Valliani et al., 2013; Jaff, 2011; Mattos et al., 2010; Mattos et al., 2002), this meta-analysis demonstrated lack of significant association between *H. pylori* infection and O blood group among study participants. On the contrary, results of the stratified analysis showed statistically significant association between O blood group and *H. pylori* positivity among dyspeptic study participants, $p = 0.002$ (Table 3). The significant association between O blood group and *H. pylori* infection was reported in many observational studies conducted among dyspeptic patients (Mattos et al., 2010;

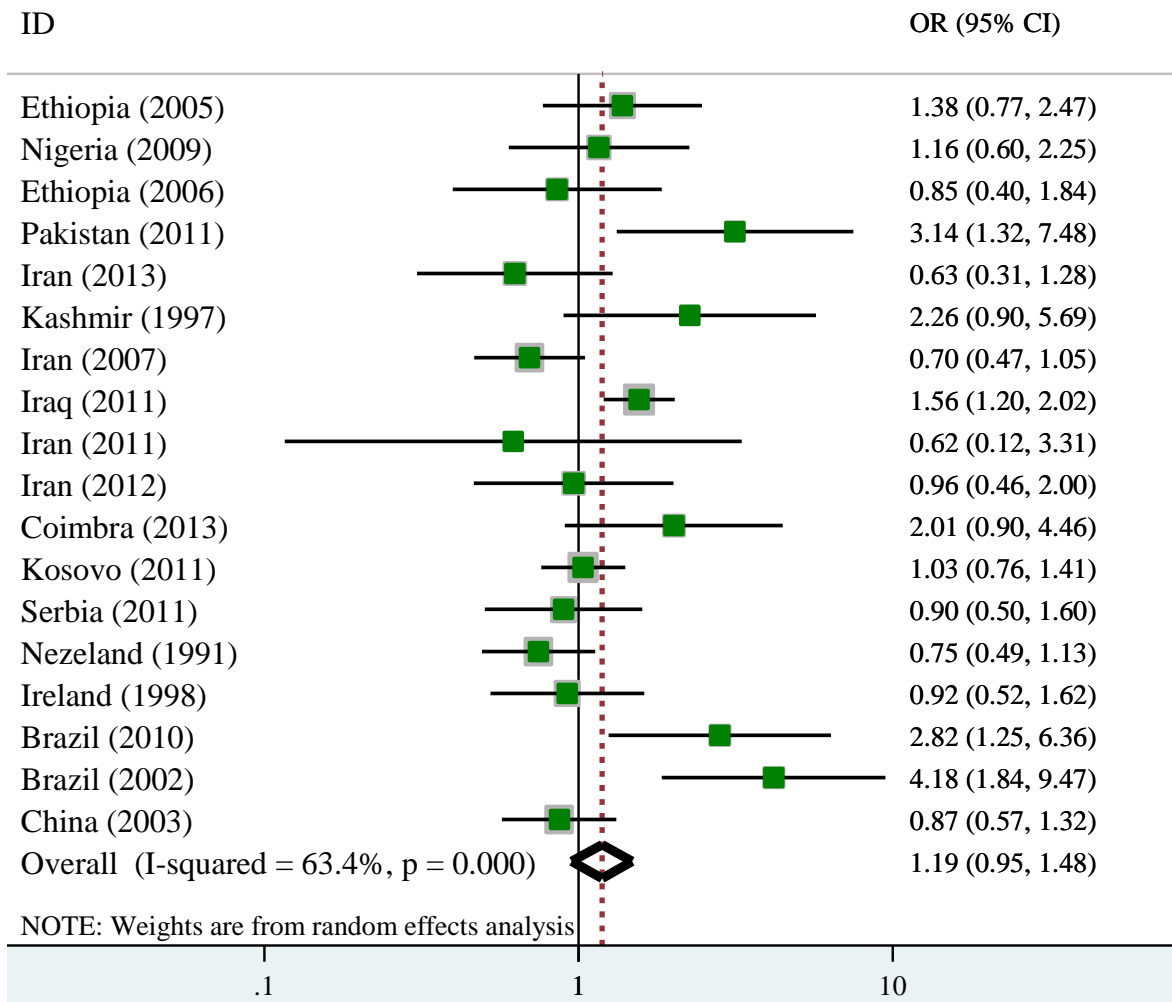


Figure 2. Forest plot of association between O blood group and *H. pylori* infection. 2013.

Table 3. Stratified meta-analysis.

Strata	Sample size	Pooled OR (95% CI)	I ² in % (P-value)	Model used
Study population				
Dyspeptic	2550	1.44 (1.03, 2.01)	64.8 (0.002)	Random
Asymptomatic	2206	0.86 (0.72, 1.03)	0.0 (0.68)	Fixed
Both	280	1.59 (0.97, 2.60)	0.0 (0.38)	Fixed
Continents				
Africa	640	1.16 (0.79, 1.70)	0 (0.62)	Fixed
Asia	2549	1.12 (0.77, 1.63)	70.2 (0.001)	Random
Europe	1612	0.97 (0.79, 1.18)	20 (0.29)	Fixed
Latin America	235	3.45 (1.94, 6.12)	0 (0.5)	Fixed
Type of country				
Developing	3424	1.302 (0.96, 1.77)	68 (<0.001)	Random
Developed	1612	0.97 (0.79, 1.18)	20 (0.29)	Fixed

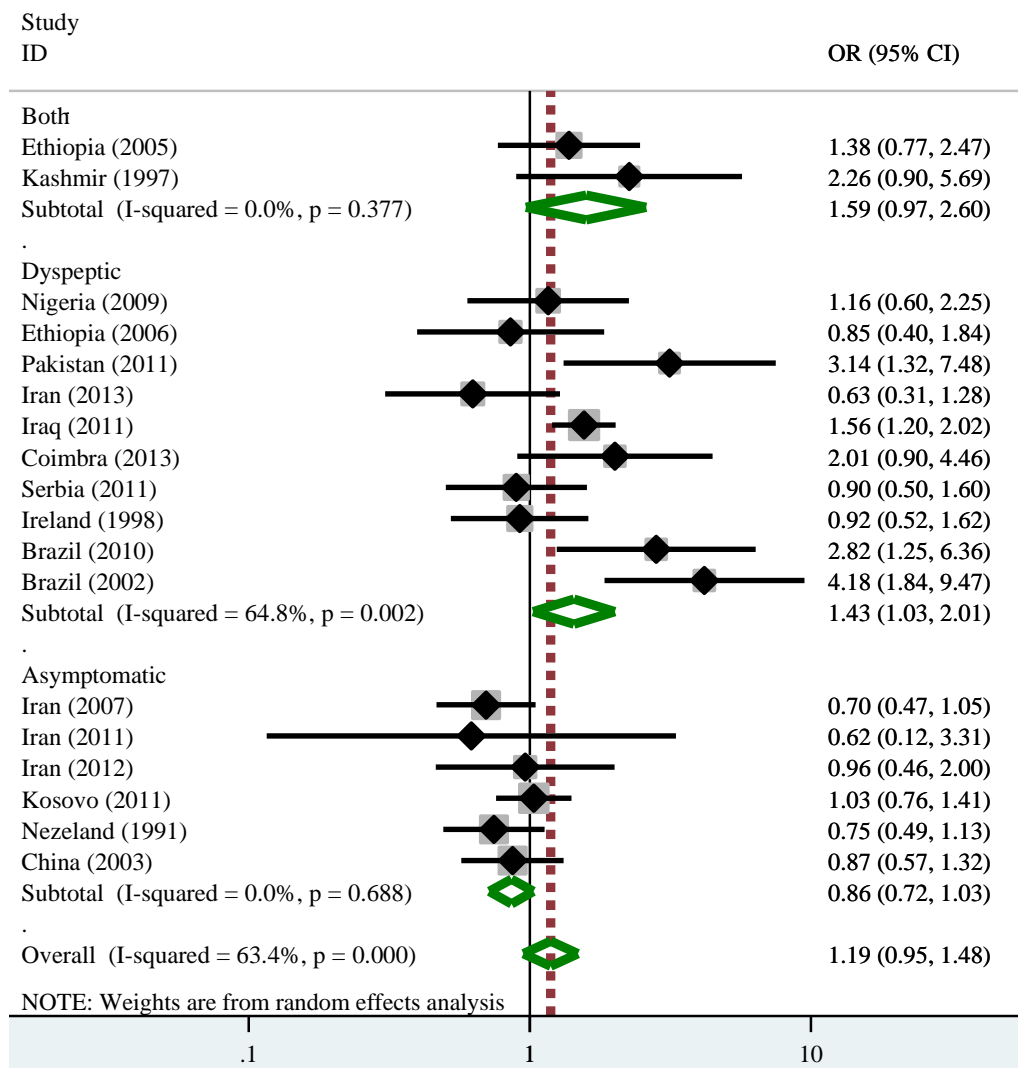


Figure 3. Forest plot of the association between O blood group and *H. pylori* infection by symptom status of the study participants.

Jaff, 2011; Mattos et al., 2002). Like in many studies elsewhere (Loffeld and Stobberingh, 1991; Rasmi et al., 2011; Zhub et al., 2011; Jafarzadeh et al., 2007; Keramati et al., 2012), such an association is not evident among asymptomatic study participants in this analysis (Table 3). Among ten reviewed studies which were conducted among dyspeptic patients, four showed statistically significant association. However, none of six studies conducted among asymptomatic patients demonstrated statistically significant association. It is noteworthy that the study participants with dyspepsia in the included studies might not be homogenous with regard to the dyspepsia severity.

Though the exact biologic mechanism of the association of blood group O and *H. pylori* infection among

dyspeptic patients remains not well understood, according to some authors it is related with the expression of carbohydrates (glycoproteins, glycolipids and free oligosaccharides) rich in fucose molecules which act as receptors of *H. pylori* into gastric tissues in greater quantities in individuals with O blood group as a result of interactions with different microorganisms (Demattos, 2012; Mattos et al., 2002). Also, individuals with O blood group were reported to have an increased density of colonization of epithelial cells and higher inflammatory responses to *H. pylori* infection than individuals with other blood groups (Alkout et al., 2000). According to the same report, the increased inflammatory response is believed to contribute to the increased susceptibility of O blood group individuals to peptic ulceration.

Owing to an enhanced inflammatory response to *H. pylori* infection and increased density of colonization, it is likely that *H. pylori* infection might be detected easily in individuals with O blood group than individuals with other blood groups. Conversely, the likelihood of serological detection of *H. pylori* infection in individuals with blood groups other than O would be lower compared to O blood group individuals. This might have artificially contributed to the observed association. According to the current analysis, the finding that none of the six studies conducted among asymptomatic study participants failed to show statistically significant association may mean that there is no real association between O blood group and *H. pylori* infection. Should real association exist between O blood group and *H. pylori* infection, the association should be evident across all strata (symptomatic and asymptomatic). However, in the role of different confounders, study methods and study participants used should not be ignored.

Close investigation of the methods used in each of the included studies showed that significant numbers of studies were conducted with few number of study participants, lacking the desired statistical power to detect the difference if it really exists. For instance, 33.3 and 56% of studies included in this meta-analysis had less than 150 and 200 study participants, respectively. More worrying problem is that 61.1% of the included studies had less than 100 study participants (as low as 8 and as high as 90) with O blood group (Table 1). The inconsistent associations reported by different authors might have occurred as a result of compromised study power in such comparative studies. None of the 18 studies have reported sample size determination.

The inconclusive findings of different epidemiological studies can also be viewed in relation with the tests used. Though serological methods used as diagnostic tool of *H. pylori* are generally simple, reproducible and inexpensive, the performance of these serological methods is reported to vary considerably depending on the methods, antigen used and type of population studied (Tadege et al., 2005). Misdiagnosis of the organism cannot be ruled out partly because it is not totally possible to exclude people in whom the bacilli were eliminated as a result of unreported antibiotics taken for illnesses other than *H. pylori*. Another limitation of the current analysis is that though different strains of the organism were reported to be accompanied by different severity of disease and distribution, the differences in the strains were not taken into account while pooling the data.

Conclusion

The study did not show statistically significant association between *H. pylori* infection and O blood group among all

study participants. However, statistically significant association between *H. pylori* infection and O blood group was observed in a subset of studies conducted among dyspeptic patients. The observed association may not mean the association is a cause-effect one. Caution should be made while interpreting the finding as the dyspeptic study participants might not be homogenous with regard to the dyspepsia severity; the sample sizes in individual included studies is generally low and different *H. pylori* strains were not taken into account.

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Full Length Research Paper

Assessment of rain water harvesting systems in a rural community of Edo State, Nigeria

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The study assessed the practice of rain water harvesting (RWH) in a rural community in Edo state, Nigeria. Using a cross sectional study design, pre-tested structured interviewer administered questionnaire were administered to 232 selected and consenting households. A structured observational checklist was used for assessment of household rainwater harvesting system. Water was collected from 15% of houses and tested for bacteriological quality. Data was analysed using statistical package for social sciences (SPSS) version 16. Results were presented as frequencies, with statistical test applied where appropriate. Findings showed that RWH was practiced by over 80% of households, with the roof top as the catchment area. Stored water was most commonly used for personal hygiene purposes. Majority of the 30 water samples tested had unacceptable levels of total coliform, while one sample had *Escherichia coli*. Health education should focus on enlightening households on appropriate design and maintenance of RWH systems.

Key words: Assessment, harvesting, rainwater, rural.

INTRODUCTION

Rainwater harvesting (RWH) is any human activity involving collection and storage of rainwater in some natural or artificial container either for immediate use or use before the onset of the next season for domestic, agricultural, industrial and environmental purposes (Kemp, 1988; Kun et al., 2004; Mati et al., 2005). The concept of RWH systems can vary from small and basic, such as the attachment of a water bucket to a rainwater downspout, to large and complex, such as those that collect water from many hectares and serve large numbers of people (Gur, 2010; United Nations Environmental Programme (UNEP), 1982). In rural areas, the most common technique is small-scale rooftop rainwater harvesting (Pacey and Cullis, 1986).

Rainwater harvesting technology involves three basic stages, namely catchment areas (rooftops and land surfaces), conveyance systems (plastic or corrugated iron gutters) and collection devices (storage tanks) (UNEP, 1982). The quality of rainwater is directly related to the cleanliness of the atmosphere, cleanliness and quality of material used for catchment surface, gutters and storage tanks (Ariyananda, 1999). In areas where the rooftop is clean, impervious, and made from non toxic materials, roof rainwater is usually of good quality and does not require much treatment before consumption (Lekwot et al., 2012). The concentration of contaminants associated with a given rainfall event tend to reduce exponentially with time following the beginning of the

event. Therefore, diverting the initial portion of runoff away from the storage device will mean that the quality of water entering storage is improved and the need for subsequent treatment reduced or even eliminated altogether (Kuntala et al., 2011; World Health Organisation (WHO), 2004).

Availability of adequate and clean water for household uses is an enormous problem for rural households in developing countries (Mwendera, 2006). RWH has the potential of meeting the water needs of these rural communities (Pacey and Cullis, 1986). Likewise, rainwater harvesting in urban areas can provide supplemental water for the city's requirements (Devi et al., 2012; Gould and McPherson, 1987).

One reason the provision of safe drinking water is of paramount concern is that 75% of all diseases in developing countries arise from polluted drinking water (Third World Academy of Science (TWAS), 2002). Each day, 25,000 people die from use of contaminated water and several more suffer from water borne illnesses (Mason, 1996). About half of the people that live in developing countries do not have access to safe drinking water and 73% have no sanitation, some of their wastes eventually contaminate their drinking water supply leading to a high level of suffering. More than five million people die annually from water-borne diseases. Of these, about four million deaths (400 deaths per hour) are of children below age of 5 years. The lack of safe drinking water also stunts the growth of 60 million children per year (WHO, 1996; WHO-UNICEF, 2000). Contamination of drinking water by urine of the rodent species '*Mastomys natalensis*' has been implicated in the spread of a disease, Lassa fever, an acute viral haemorrhagic disease endemic in parts of West Africa, including Nigeria (Acha and Szyfres, 2003; Heymann, 2008; McCormick et al., 1987, Public Health Agency of Canada, 2010). As much as one-tenth of the global disease burden could be prevented by improving water supply, sanitation, hygiene and management of water resources (Vilane and Mwendera, 2011; WHO, 2004).

The provision of water for domestic and other uses in rural and urban centres is one of the most intractable problems in Nigeria today, with 52% of Nigerians lacking access to improved drinking water supply (Lekwot et al., 2012; Orebiyi et al., 2010). Nigeria is endowed with enormous surface and groundwater resources, yet the provision of potable and safe water supply is still inadequate. (Nwankwoala, 2011). The Millennium Development Goals (MDGs) of halving by 2015 the proportion of people without sustainable access to adequate and affordable safe drinking water will be hard to achieve due to low levels of existing coverage, but this will become almost impossible if sustainability levels cannot be improved (Nwankwoala, 2011). Despite the seeming intractable problem of water scarcity in Nigeria, the high

neonatal and childhood mortality due to diarrheal diseases and the common practice of RWH, particularly in Edo state, there is little attention paid to the assessment of the state of RWH systems.

MATERIALS AND METHODS

Study area

The study was carried out in Usugbenu, located in Esan Central local government area, Edo state, in the South-south geopolitical region of Nigeria. The community, having one political ward (ward 6) and a population of less than 4,000 lies along latitude 60° 10' and 60° 45' north of the equator and between longitudes 60° 10' and 60° 30' east of the Greenwich Meridian, within the tropical region. Sited on a relatively flat plateau called the Esan plateau, the area lies about 466 km above sea level. The water aquifer is put at about 150 m. The tropical climate is dominated by high temperature, high humidity and heavy rainfall. The area is characterized by two distinct seasons, the wet season which lasts between March and November and the dry season which lasts between November and February. The community is made up of 10 quarters or hamlets. Inhabitants are mainly Esan in origin, predominantly peasant farmers and petty traders. Christianity is the major religion. The community suffers a lack of public utilities and infrastructure.

Study design

A descriptive cross sectional study design was utilized for the study.

Study population

Study population comprised households and their houses within the community. Household head or any adult within the household aged over 18 years and who met the inclusion criteria were invited to participate. Inclusion criteria was that they should have been living in the community for not less than one year, as this was enough time to have built a water harvesting system and used it for water supply considering the two seasons prevalent in the community and the giving of consent. Households with no adult present at the time of the study, or where consent was not given, were excluded.

Sample size calculation

Sample size was calculated using the formula for prevalence study with z as 95%, p set as 84% being the prevalence of people who were aware of sources of rainwater contamination in a study carried out in Uganda (Baguma et al., 2010), and non-response rate of 10%. Sample size was calculated as 232.

Sampling technique

Multi stage sampling technique was used for sample selection. The community was desegregated into quarters and 50% of the quarters selected. In each selected quarter, a count of the number of houses was undertaken, and proportionate allocation used to determine the number of houses required from each cluster. Using a count of the number of streets/roads in the cluster, an estimate of

the average number of houses per street was obtained, and the number of houses required for participation per street calculated. Random sampling was used to select houses in each street. In all selected houses, the head of household or in his/her absence, an adult who meets the inclusion criteria was invited to participate. Research assistants included final year medical students of the Ambrose Ali University, on posting in the Department of Community Health. They were trained for one-day on questionnaire administration to enable uniformity in data collection.

Data collection methods

Data was collected using quantitative data collection tools: a survey questionnaire, checklist and bacteriological assessment of water quality. The survey questionnaire was adapted from that used in a previous study (Mosley, 2005) and focused on demographic characteristics of the respondents, practice of RWH and perceptions of water quality. The survey questionnaire was pretested amongst 20 households in a neighbouring community for validity. The checklist designed by the researchers with input from experts in the field and a checklist used in an earlier study (Mosley, 2005) provided a tool for assessing the state of the RWH system. Scores were assigned to a set of ten pre-determined criteria that included the level of completeness of the system, quality of the individual components present, nature of reservoir, quality of reservoir, presence or absence of lid and tap on the reservoir, presence of overhanging vegetation and state of roof. A score of two '2' was assigned to a criteria where present and in good condition, one '1', when present but in poor condition and zero '0', where absent. Highest possible score for any system was twenty points. Points for each house were summed up and graded. A score between 0 and 10 was graded unsatisfactory system, and > 10 satisfactory system.

For water quality assessment, water samples were collected from 15% of survey households (Kuntala et al., 2011) selected through random sampling. For all reservoirs, water sampling was done using guidelines of the American Public Health Association (APHA) (1985) and National Standard of Drinking Water Quality (NSDWQ) (2007). Water was collected aseptically in autoclaved 25 cl plastic bottles provided by a public health laboratory. Samples were transported in black plastic bags containing ice and brought promptly to the laboratory within 2 hours, kept in refrigerator at 4°C and examined within 16 hours of collection.

Samples were analyzed using standardized bacteriological methods for water quality analysis (Cheesebrough, 1987; WHO, 1984) to determine the degree of contamination. All samples were analysed for total bacterial count and *E. coli*. The microbiological quality was assessed by most probable number (MPN) method (Fawole and Oso, 2001). Total coliforms was indicative of environmental contamination (from bird faeces, dead leaves etc) and *E. coli* of human faecal contamination (Abott et al., 2012). Samples with MPN of total coliforms as 0 coliforms/100 ml were graded as excellent, 1 to 3 coliforms/100 ml acceptable, and 4 to 10 coliforms/100 ml as suspicious and >10 coliforms/100 ml as unsatisfactory. *E. coli* was recorded as either absent (MPN 0/100 ml *E. coli* detected), or present (MPN > 1/100 ml *E. coli*) (Mechenian and Andrews, 2004).

Data analysis

The completed questionnaires were screened for completeness, coded and entered by the researcher into the statistical package for social sciences (SPSS) version 16.0 (SPSS Inc, Chicago IL 60606-

6412). Discrete data were presented as proportions (percentages) while continuous variables such as age were expressed as means \pm standard deviation. Statistical analysis of differences between proportions were carried out using of chi-square test. Statistical significance was set at $p < 0.05$ for all values of the chi square test. Ethical clearance was obtained from the Teaching hospital's ethical committee. Verbal approval for the study was obtained from the traditional head of the community. Informed consent was obtained from each respondent before the conduct of interviews.

RESULTS

Two hundred and thirty two eligible respondents were included in the study. Mean age of respondents was 41.8 ± 15.6 years. Male respondents made up 164 (70.7%), Christianity was the predominant religion, 214 (92.2%). One hundred and fifty six (67.2%) respondents were unskilled, and the majority, 154 (66.4%) were married. Mean number of households in a house was 1.1 ± 0.4 years; average length of stay in the community was 29.9 ± 18.8 years. Mean income per month was given as ₦17,551.7 \pm ₦9,063.8 (Table 1). One hundred and ninety three (83.2%) of 232 households practiced rain water harvesting in their homes. These respondents were asked further questions on RWH. Of this number, all (100.0%) collected rainwater from roof tops.

Maintenance of reservoir and roof surfaces

Sixty one (31.6%) claimed to have ever washed their gutter systems. Forty (20.7%) respondents claimed to have a mechanism for diverting first rains, 24 (12.4%) respondents claimed to have leaf control screens in the gutters and 39 (20.2 %) respondents claimed to have leaf control devices on their reservoirs. Devices were mainly in form of wire gauze and mesh (Table 2). One hundred and seventy (88.1%) claimed to have ever washed the reservoir in their houses since occupancy. Of this number, the majority, 146 (85.9 %) claimed it was washed over a year ago, while 24 (14.1%) had washed once within the past one year. One hundred and thirty nine (72.0%) claimed to have ever replaced or repaired their reservoir. One hundred and eight (56.0%) respondents claimed their roof had ever been changed or repaired.

Household use of harvested rain water

Water was said to be piped indoors by 92 (47.7%) respondents and be available outdoors by 101 (52.3%). Most common use for stored water was for personal hygiene by 179 (92.7%). Others were: domestic chores by 178 (92.2%), cooking 178 (92.2%), irrigation purposes/animal husbandry by 139 (72.0%). Least common use was for drinking by 147 (76.2%) (Figure 1). Seventy seven (52.4 %) of the 147 respondents who

Table 1. Demographic characteristics of respondents (N = 232).

Variable	Frequency	Percentage
Sex		
Male	164	70.7
Female	88	29.3
Educational level		
None	23	9.9
Primary	39	16.8
Secondary	132	56.9
Tertiary	38	16.4
Religion		
Christianity	214	92.2
Islam	14	6.0
Position in household		
Male head of household	117	50.4
Female head of household	23	9.9
Others	92	39.7
Educational status		
None	23	9.9
Primary	39	16.8
Secondary	132	56.9
Tertiary	38	16.4
Marital status		
Married	154	66.4
Widowed/ separated	31	13.4
Single	47	20.3
Socioeconomic status		
Unskilled	156	67.2
Semi-skilled	53	22.8
Skilled	23	9.9

used harvested rain water for drinking claimed to treat the water before use. Of this number, most common method of treatment was the addition of water guard (chlorination) to the water by 43 (55.8%). Boiling and filtering of water was carried out by 19 (24.7%) and 15 (19.5%), respectively.

Assessment of water quality by health authorities

Thirty seven (19.2%) respondents claimed their RWH system had ever been inspected by local authorities. One

hundred and sixty one (83.4%) respondents claimed never to have carried out any form of quality assessment of the harvested water, 8 (4.1%) had checked for physical quality, and 24 (12.4%) had done microbiological assessment. One hundred and sixteen (60.1%) respondents claimed to have ever seen leaves, insects and reptiles in the water contained in their reservoirs.

Perception of adequacy of water

Harvested water was judged sufficient for family use throughout dry season (without the need to get water from alternative sources) by 70 (36.2%) respondents, and inadequate for 123 (63.7%) respondents. Other sources of water commonly used in dry season included streams, commercial boreholes, commercial water tankers and water vendors using wheel barrows.

Perceptions of water quality

Water was said to have smell all the time by 23 (11.9%) respondents, and sometimes by 54 (28.0%). Water was said to have taste all the time by 7 (3.6%) and sometimes by 47 (24.4%). It was said to have colour all the time by 16 (8.3%) respondents and sometimes by 54 (28.0%).

On-the-spot assessment of RWH system

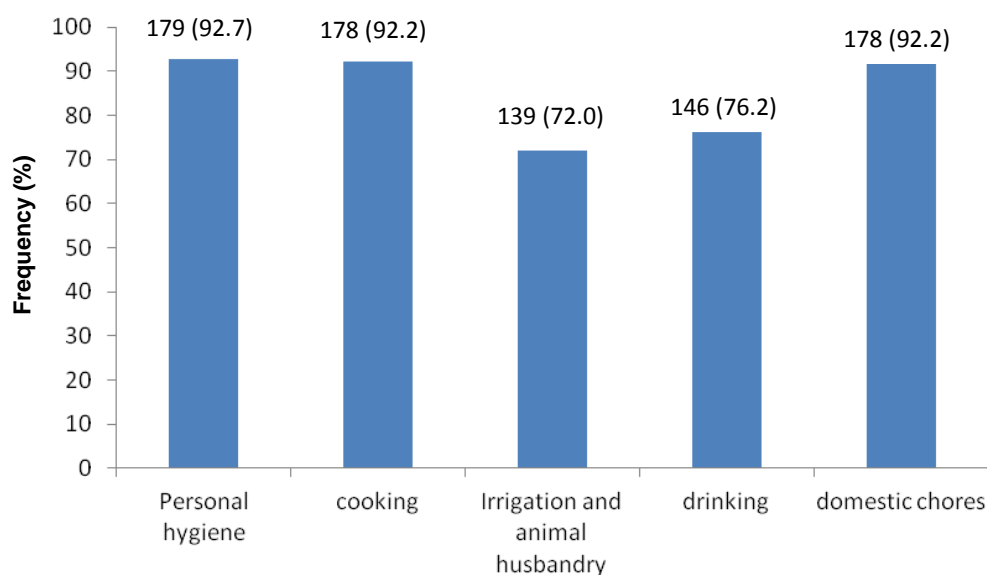
Of the 193 houses where RWH was practiced, the roof was surrounded by a concrete parapet in 8 (4.1%) houses, corrugated iron sheet in 122 (63.0%) and long span aluminium in 63 (32.9%) of houses. Vegetation was overhanging the roof catchment area in 78 (40.4%) of houses. One hundred and thirty two (68.4%) had reservoirs submerged into the ground, 38 (19.7%) had surface reservoirs and 23 (11.9%) had both surface and underground reservoirs. Reservoirs were predominantly made of cement, 147 (76.2%), while 22 (11.4%) and 24 (12.4%) were of long-span aluminium and poly(vinyl chloride) (PVC), respectively. Mean length of time since reservoir was built was 12.7 ± 12.9 years, and mean length of time since reservoir was in actual use was 9.7 ± 7.0 years.

One hundred and seventy houses (88.1%) had gutters in place, while for 23 (11.4%) houses, water collection from roof top was freefall. Of those with gutters, the majority, 116 (68.2%) were poly vinyl chloride, while 46 (27.1%) and 8 (4.7%) corrugated metal sheets and metal poles, respectively.

Gutters were present and found to be in good condition (without obvious cracks) in 96 (56.5%) of 170 houses, and in poor condition in 74 (43.5%) houses. A down pipe

Table 2. Respondents manner of protection of RWH system.

Variable	n (%)	
	Yes	No
Ever washed gutter	61 (31.6)	132 (68.4)
Ever washed reservoir	170 (88.1)	23 (11.9)
Presence of filter screens/ leaf control devices		
In gutter	24 (12.4)	169 (87.6)
Over reservoir	39 (20.2)	154 (79.8)
Presence of first flush diverters	40 (20.7)	153 (79.3)

**Figure 1.** Household use of harvested rain water.

connecting the gutter with the reservoir was found in 94 (55.3%) houses. A lid was found to be present and tight fitting in 16 (8.3%) reservoirs, absent in 15 (7.9%) and present but not tight fitting in the majority, 159 (83.7%). The reservoir inlet was screened in 77 (40.5%) houses (Table 3).

Overall, the condition of RWH system was judged to be satisfactory in 70 (36.3%) houses and unsatisfactory in the majority, 123 (63.7%). There was no significant association found between state of RWH system and occupation of head of household ($P = 0.95$). State of RWH system was significantly associated with gender of head of household ($P = 0.00$), religion ($P = 0.00$) and marital status of head of household ($P = 0.00$) such that singles, Christians and female headed households had better practice of RWH.

Micro-bacteriological assessment of RWH

Laboratory analysis of water collected from 30 houses randomly showed mean count for MPN of total coliforms was 12.7 ± 32.0 coliforms/100 ml (median 7.0, range 0 to 180). The larger proportion of samples 12 (40.0%) were classified to have suspicious levels of total coliforms. Five (16.7%) samples were graded excellent and 4 (13.3%) satisfactory, 9 (30.0%) samples were graded unacceptable. Only one sample was positive for *E. coli*.

DISCUSSION

The study showed that rain water was harvested primarily from rooftops. In Brazil, Argentina and Paraguay, RWH is

Table 3. On- the- spot assessment of RWH system (n = 193).

Variable	Frequency (%)
Nature of roof	
Corrugated iron sheet	122 (63.0)
Long span aluminium	63 (32.9)
Concrete with parapet	8 (4.1)
Completeness of system	
Gutter present	170 (88.1)
Downpipe present	94 (55.3)
Quality of gutter	
Good condition	96 (56.5)
Poor condition	74 (43.5)
Quality of surface reservoir (n=61)	
Intact, and outwardly water-tight	44 (72.6)
Non-intact or patched	17 (27.9)
Presence of tap	
Yes	23 (11.9)
No	170 (88.1)
Lid	
Present and tight fitting	16 (8.3)
Present not tight fitting	159 (83.7)
absent	15 (7.9)
Overhanging vegetation	
Present	78 (40.4)
absent	115 (59.6)

done using surface water collected into cisterns or surface ponds (Smet, 2005). For quality reasons, rainwater for human consumption is preferably collected from roofs as surface water is highly polluted. Where roof tops are rusty and covered with dirt, rain water collected from roof tops may have higher chemical contents than otherwise. Most of the rooftops in the present study were of corrugated iron sheets, which are subject to rust with time. The presence of overhanging vegetation observed in over one-third of houses has the disadvantage that pollution of water from dead leaves and bird droppings can make the water unsafe for drinking in its untreated state. Though there is little agreement on the effect of roof composition on concentration of dissolved metals and other trace elements in water (Foster, 1996; Hart and White, 2006; Van Metre and Mahler, 2003), leached minerals and organic matter from trees may impart smell and colour to the water contained in the reservoir.

The greater proportion of reservoirs that were built with

cement and partly submerged in the ground was noted in the study site. This is contrary to what was observed in Swaziland (Vilane and Mwendera, 2011). Above ground storage makes access to and maintenance of the tank easier. Advantages of below-ground tanks include structural support of the soil, temperature moderation and protection from vandalism. However, it is more difficult to detect and repair leaks in these storage containers. Expansion and contraction of soil, particularly clay-rich soils, can lead to cracking, leaking and structural damage if proper reinforcement of the tank is not present (Barnes et al., 2010). Another benefit of surface tanks over sub-surface or underground tanks is that water can be easily extracted through a tap just above the tank's base (Benes, 1975).

The common practice of leaving gutters and reservoirs unwashed for up to a year was also documented in a study carried out in other parts of Esan land (Marcus, 2011), South Australia (Perera et al., 2011) and New Zealand (Abott et al., 2012) and which is in contrast to the three to four monthly interval recommended (Coombes and Abott, 2010). Rainwater users can reduce their risks of disease from contaminated rainwater consumption by regular cleaning (Coombes and Abott, 2010).

The average length of time reservoirs had been in use was similar to what was reported in South Australia (Rodrigo et al., 2010). The importance of this finding is that increase in family size or activity may warrant the addition of more reservoirs to cope with increasing water demand. Also, the use of a particular reservoir for long periods will require that attention is paid to the maintenance of the reservoir to prevent it from being an additional source of hazard to users.

Gutters were predominantly made from PVC, contrary to what was reported in a previous study in Mkpata community, Swaziland (Signwane and Kunene, 2010) where they were mainly metal. Gutters have also been constructed from bamboos sticks and wood (Smet, 2005). The use of first flush diverters, leaf control devices on reservoirs and leaf control screen on gutters by less than 30% of households is lower than what was reported in South Australia, where it was found to be in use in 30.8%, 57.2 and 25.5%, of households, respectively (Rodrigo et al., 2010). Research has shown that the initial 'first flush' of runoff is more polluted than subsequent flows and that the concentration of contaminants associated with a given rainfall event tends to reduce exponentially with time. Therefore, diverting the initial portion of runoff generated by a storm away from the storage device will mean that the quality of water entering storage is improved and the need for subsequent treatment reduced or even eliminated altogether (Singwane and Kunene, 2010). The absence of gutter screens and first flush systems in the study area, implies that first

rains are not diverted and go on to contaminate reservoir water. It is important that health educators ensure that households understand the use and see the need to incorporate these devices during construction of RWH systems in their homes.

The finding that the tanks were usually cleaned, though at differing timings, has been observed in other studies (Ariyananda and Aheeyer, 2011; Rodigo et al., 2010). The low frequency with which water collection tanks were washed in this study is similar to what was found in South Australia (Rodrigo et al., 2010). It is recommended that the reservoir be cleaned annually (Coombes and Abott, 2010).

Harvested rain water was used for drinking by about 76% of households, similar to what was reported in a previous study carried out in Sri Lanka (Lanka Rain Water Harvesting Forum, 2010). This figure is a far cry from the value of 30% observed in a study carried out in Ethiopia (Devi et al., 2012) and 42% in selected communities in Esan land (Magnus, 2011). Slightly above half of all households surveyed claimed to treat the drinking water, which is slightly higher than what was reported in some communities in Bangladesh (Rana, 2009) and West Bengal (Kuntala et al., 2011). Most common method for purification was use of water guard. Made of chlorine compounds, water guard is easily obtained from the local chemist, can be applied with no adverse health effects and when compared to boiling of water, more cost effective. Boiling was the more common method for water treatment in a study carried out in 9 provinces in Sri Lanka (Ariyananda and Aheeyer, 2011). On the contrary, a study carried out in three villages in Paikgacha Thana, Khulna in Bangladesh found as much as 66% of households drinking water from RWH systems without any form of treatment (Rana 2005). It is most imperative to treat rain water from tanks particularly in a developing country like Nigeria, where pollutants in atmospheric air readily contaminate rain water.

Personal hygiene was the most common use of harvested rain water among households studied. This is similar to what was observed in Kaduna, in the northern part of the country (Lekwot et al., 2012). During dry seasons, some families supplemented harvested water with water from stream, contrary to what was reported in Kaduna (Lekwot et al., 2012), where the hand dug well was more popular. Rain water harvesting in the study site was found to be the main source of water for household use during rainy season, with some turning to alternative sources during dry season. This was similarly observed in Trinidad (Dean et al., 2012). The latter study also found respondents satisfied with quality of harvested water, as was also observed in the present study where complaints of water having smell, taste or colour were minimal. The finding of better managed RWH systems among female headed households and singles is not

surprising, as women are generally more interested in the health and safety of their families, and pay closer attention to matters of sanitation and hygiene. The better practice among Christians may be as a result of their being more in a monogamous relationship, with closer family ties and attention to health of family members.

Most respondents reported that there had never been any inspection of their RWH system. This situation is unfortunate, as government health departments are meant to be fore-runners in the protection of health and drinking water quality through inspection and supervision of constructed domestic RWH systems. Similar reports have been documented in Uganda, where about 61.5% of households had not been visited by health or project officers from non-profit health education programmes since installation of water storage system (Baguma et al., 2010). Very few households had ever checked their water for chemical or microbiological contamination. Individuals could also be encouraged to subject collected rain water to laboratory investigation.

Microbiological indicators have been used to determine or indicate the safety of water for drinking. Coliforms are considered the primary indicators of faecal contamination. Their presence in drinking water indicates that disease causing organisms could be in the water system and may pose an immediate health risk (Raina et al., 1999; Tebutt, 2007).

Total coliform content of water from most of the reservoirs in this study was far higher than what is recommended by the WHO and similar to what has been reported in some studies (Agbabiaka and Sule, 2010; Okorafor et al., 2012; Ibe and Okpieny, 2005). Likely sources of total coliforms will be from faecal matter of birds, rodents, dead insects either deposited on the roofs, gutters or where tank lid is not sealed tightly, or even from the tank itself. The low proportion of samples with *E. coli* which indicates that most of the water samples are free from recent faecal contamination, was similarly found in a study conducted in some communities within the vicinity of the study area (Magnus, 2011) and contrary to what was found in Ogun state (Aina et al., 2012). The finding of high coliform counts with no *E. coli* present is also reported in a study carried out in New Zealand (Abbott et al., 2007).

Conclusion

The study shows gaps in the implementation of RWH in this community, a factor that can increase pollution of water and spread disease. Aggressive health education is required to give the necessary enlightenment to the standard design for a RWH system, and motivate the people to comply. Advocacy to local leaders may help in this regard. Government should play an active role in

addressing the gaps observed in the installation of RWH systems to prevent disease outbreaks.

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Full Length Research Paper

Predictors of pneumococcal immunization uptake among caregivers of children with sickle cell disease in Lagos, Nigeria

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Pulmonary infections are still the most prevalent cause of death of children with sickle cell disease (SCD) in low and middle income countries. Pneumococcal conjugate vaccine (PCV) has been reported to reduce the incidence of pneumococcal disease by up to 90% in children under five. This study set out to report the proportion of children under five attending Lagos University Teaching Hospital (LUTH) and Massey Street Children's Hospital (MSCH) in Lagos that received PCV and the factors influencing uptake. A cross sectional study assessed the sociodemographic characteristics, knowledge and practices of 380 caregivers of children with SCD and the immunization status of the children. Proportion of children who had received routine immunization was 99.7%. However, 87 children (22.9%) had been immunized with PCV and predictors for immunization were attending LUTH, mothers' age, knowledge level of PCV and higher monthly income. The study recommends PCV being made part of the national immunization programme.

Key words: Lagos, Nigeria, sickle cell disease, pneumococcal conjugate vaccine, immunization uptake.

INTRODUCTION

Pulmonary infections are still the most prevalent cause of death of children with sickle cell disease (SCD) in low and middle income countries (Weatherall, 2010). Since sickle cell anaemia (SCA) was declared a public health priority in 2008 (United Nations, 2012), there have been 300,000 births annually of babies with the condition, 75% of them in Africa (WHO, 2012a,b). Figures are projected to rise to 6 million people with SCA (Scott et al., 2011; Makani et al., 2011) given a survival rate of half the normal expected for Africans. Children born with SCD in high income countries (HIC) have better chances of survival than their counterparts from low and middle income countries (LMIC). Pulmonary infections are still the most prevalent cause of death of children with SCA and reports have documented that the risk of early invasive bacterial disease in affected children is 53 to 600 times

higher than in the general population (Overturf, 1999; Modell and Darlison, 2008; Intzes et al., 2013; Van Beneden et al., 2010; Science Daily, 2007; Battersby et al., 2010). Comprehensive care that includes parental education, penicillin prophylaxis, pneumococcal vaccination, has been shown to increase the life expectancy of people with sickle-cell disease in developed countries and the Caribbean to 45 to 55 years (WHO, 2006). The efficacy of pneumococcal vaccine has been reported to reduce the incidence of pneumococcal disease by 90% among under five sickle cell patients and 68% among sickle cell patients younger than ten years (Van Beneden et al., 2010; Halasa et al., 2007; CDC, 2012; Adamkiewicz et al., 2008; DeStefano et al., 2008). This study set out to document the proportion of under-five sickle cell patients who had received pneumococcal

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Table 1. Socio demographic characteristic of the participants.

Variables (n = 380)	Frequency (%)
Age (Years)	
18 - 30	105 (27.6)
31 - 40	185 (48.7)
41 - 50	85 (22.4)
51 - 60	5 (1.3)
Sex	
Male	39 (10.3)
Female	341 (89.7)
Marital status	
Never married	4 (1.1)
Married	352 (92.6)
Widowed	24 (6.3)
Occupation	
Housewife/Student	42 (11.1)
Manual	32 (8.4)
Clerical	35 (9.2)
Sales and services	222 (58.4)
Professional/Technical/Managerial	49 (12.9)
Educational level	
Secondary or lower	204 (53.7)
Post-secondary	176 (46.3)
Average monthly income	
<₦20,000	83 (21.8)
₦20-50,000	154 (40.5)
₦50-100,000	62 (16.3)
₦100,000 and over	50 (13.2)
Religion	
Christianity	231 (60.8)
Islam	149 (39.2)
Tribe	
Yoruba	242 (63.7)
Igbo	93 (24.5)
Others	45 (11.8)
Spouse occupation	
NA/Unemployed/Student	42 (11)
Manual	46 (61.1)
Clerical	71 (18.7)
Sales/Services	160 (42.1)
Professional/Technical/Managerial	61 (16.1)

immunization among care givers of under five children with sickle cell disease.

METHODOLOGY

This was a descriptive, cross-sectional study carried out in two tertiary hospitals purposively selected from the four which provide specialist care to sickle cell disease patients in Lagos State. Lagos University Teaching Hospital (LUTH) and Massey Street Children's Hospital (MSCH) see the highest burden of children with sickle cell disease. A previous study reported the proportion of children with sickle cell anaemia who had been vaccinated was 65.8% which was used to calculate the sample size of three hundred and eighty (Nacoulma et al., 2006). Caregivers were enrolled consecutively at the outpatient clinics of both hospitals proportionate to their patient load. One hundred and fifty one (151) and two hundred and twenty nine (229) caregivers were recruited from LUTH and MSCH, respectively. On recruitment, data was collected using an interviewer-administered, semi-structured questionnaire adapted from the WHO New Vaccine Post Introduction Evaluation Tool and previous studies in Cameroun and South Africa (Njuma, 2011; Africa, 2009; WHO, 2012).

Sociodemographic characteristics of caregivers and the index children collected were age, gender, ethnicity, marital status, level of education, occupation, monthly income, family size and number of children with sickle cell anaemia, history and duration of disease. Knowledge about pneumonia and pneumococcal vaccine was determined as low, moderate and high based on the number of correct responses. The ethical approval for the study was obtained from the Human Research and Ethical Committee of Lagos University Teaching Hospital and the Health Service Commission of Lagos State. Written informed consent was obtained from each participating respondent.

RESULTS

Sociodemographic characteristics

Three hundred and eighty participants were interviewed during the course of the study. The age of the respondents ranged between 25 and 52. The mean age of the respondents was 36.2±6.1 years.

Most of the respondents were females 89.7% (341/380), married 92.6% (352/380), Christians 60.8% (231/380), of Yoruba extraction 63.7% (242/380), and had education up to secondary school level 90% (359/380), with almost half 46% (176/380) having post-secondary school education. Majority (88% (336/380)) were employed along with 89% of the respondents' spouses. Monthly household income was well over the poverty line with 40.5% (154/380) of the respondents reporting between twenty and ₦50,000 (equivalent to \$125 to \$310), and more high income earners than low income earners (29.5 and 21.8%), respectively (Table 1). Less than 9% of respondents (34/380) had suffered the loss of a child to SCA and 14.2% were members of an SCA group. Less than a third (117/380) knew about the existence of a pneumococcal vaccine and their source of information was from a health worker/doctor. In total, 87 children (22.9%) had received the pneumococcal vaccine.

vaccine and the factors that influence the uptake of

Table 2. Sociodemographic correlates of vaccination status of index child.

Characteristic	Pneumococcal vaccine		Total	χ^2	P
	Yes (%)	No (%)			
Knowledge Level (N=380)					
Poor knowledge	39 (13.4)	251 (86.6)	290	68.73	0.001
Moderate knowledge	33 (47.1)	37 (52.9)	70		
Good knowledge	15 (75)	5 (25)	25		
Average monthly household income (N=349)					
< ₦ 20,000	20 (24.1)	63 (75.9)	83	20.29	0.001
₦ 20-50,000	30 (19.5)	124 (80.5)	154		
₦ 50-100,000	12 (19.4)	50 (80.6)	62		
₦ 100,000 and over	25 (50)	25 (50)	50		
Hospital attended (N=380)					
LUTH	74 (49)	77 (51)	151	94.34	0.0001
MSCH	13 (5.7)	216 (94.3)	229		
Educational level of respondents (N=380)					
Secondary or lower	14 (6.9)	190 (93.1)	204	63.96	<0.0001
Post-secondary	73 (41.5)	103 (58.5)	176		
Gender of caregivers (N=380)					
Female	64 (18.8)	277 (81.2)	341	32.04	0.001
Male	23 (59)	16 (41)	39		

Knowledge and attitudes to pneumococcal vaccine

More than two thirds 70.5% (268/380) of the participants knew that pneumonia could be a deadly disease in children and about half 50.5% (192/380) knew that sickle cell patients are more likely to suffer pneumonia than other children without the disease. Less than a quarter of 22.6% (86/380), the respondents knew that there is a vaccine that can protect against pneumonia. Approximately, one fifth of the participants knew that sickle cell patients are especially in need of pneumococcal vaccine [19.7% (75/380)], pneumococcal vaccine could be given to a child less than one year [15.3% (58/380)], that pneumococcal vaccine is not given as a single dose [16.3% (62/380)], that the vaccine is available in Lagos [19.2% (73/380)] and that a child who has had pneumonia should still be given a vaccine [17.9% (69/380)]. About half 54.5% (207/380) of the respondents knew that pneumococcal vaccine is not part of the routine EPI vaccines. Overall, knowledge of study participants was poor with 76.3% (290/380) getting less than 5 out of 14 possible correct responses to knowledge questions. Knowledge level was significantly positively associated with immunization status of the index child; however, less than two-thirds of the respondents [60.9% (53/87)] who had vaccinated their children were aware of the name and

the name and purpose of the vaccine (Table 2). Majority of the respondents [90.8% (345/380)] had a positive attitude towards pneumococcal vaccine. Significantly more caregivers who attended LUTH and received the vaccine, paid for it compared to those that attended MSCH.

Routine and optional vaccine uptake

Majority 99.7% (379/380) had completed their child's routine immunization. Approximately a quarter had received pneumococcal 22.9% (87/380), while 10% of caregivers had taken Haemophilus influenzae type b vaccine (HIB) and Rotavirus (Figure 1).

A binary logistic regression model was used to determine the major significant predictors of vaccine uptake. The strongest significant predictor is the hospital attended by the respondent (OR=15.96, p=0.001). Other strong significant predictors of positive uptake of pneumococcal vaccine include gender (OR=6.22, p=0.001) and educational level (OR=9.61, p=0.001) (Table 3).

A positive knowledge score was also found to be significant predictor for taking the vaccination (OR=1.528, p=0.001). This means that as their knowledge score increases by 1 (one), caregivers were 1.528 times more likely to vaccinate; and caregivers categorized as having

Table 3. Logistic regression of significant predictors of vaccine uptake.

Predictor	P-value	Odds ratio (95% CI)
Hospital attended		
LUTH	0.001	15.96 (8.38 - 30.41)
Educational level		
University	0.001	9.61 (5.17 - 17.88)
Spouse occupation		
Professional/Managers	0.000	8.495 (3.620 - 19.932)
Level of knowledge		
Good knowledge	0.001	7.76 (2.58 - 23.33)
Moderate knowledge	0.001	2.81 (1.49 - 5.26)
Gender		
Male	0.001	6.22 (3.11 - 12.4)
Income		
Over ₦100,000	0.003	3.15 (1.49 - 6.66)

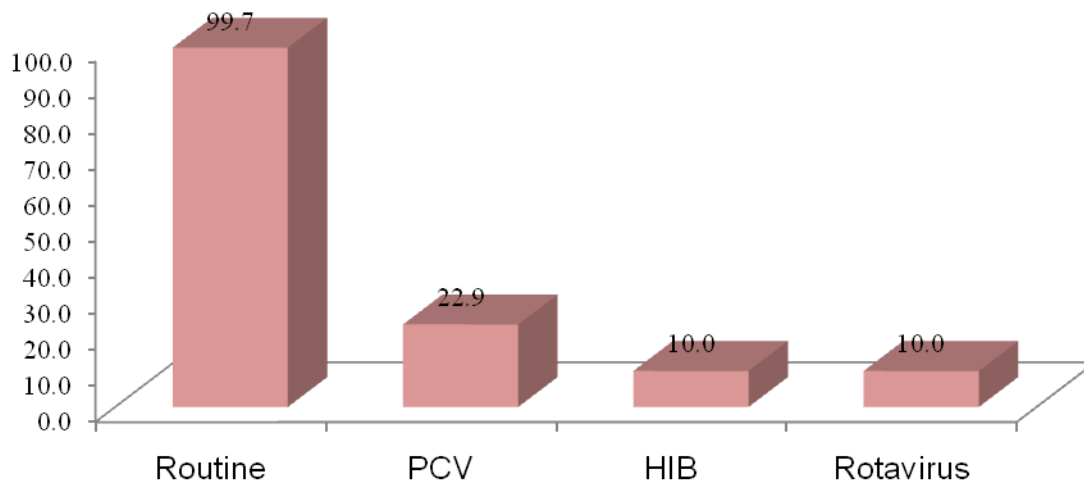


Figure 1. Routine and optional immunization uptake.

‘good knowledge’ were 7.7 times more likely to immunize the child than those categorized as having ‘poor knowledge’. Similarly, a respondent who attended LUTH was 15.9 times more likely to be vaccinated with pneumococcal vaccine than a respondent attending Massey Street Children Hospital. With regard to income the only significant predictor was an average monthly income greater than 100,000 Naira (equivalent to \$650.00), otherwise income was not a good predictor.

DISCUSSION

This study conducted over four months in two tertiary

hospitals in Lagos State obtained information from three hundred and eighty caregivers of children under five years with sickle cell disease. Those who attended LUTH were more likely to have more knowledge about the dangers of pneumococcal infections in children with sickle cell disease, and vaccinated their children, even though they may not have known the name or purpose of the vaccine. As compared to another studies, the other predictors of PCV uptake were caregivers who had university education, professionals and had good household income (Mutua et al., 2011). It has been documented widely that caregivers with social power from education and high incomes are more likely to take advantage of child

survival strategies (Bosch-Capblanch et al., 2012). Morbidity and mortality from invasive pneumococcal disease has been demonstrated to reduce significantly following widespread use of PCV (Adamkiewicz et al., 2008). There is also documentation of the effect of herd immunity that is conferred on other non-vaccinated children and adults, which can be exploited with selected immunization of children at risk (Roca et al., 2011; Donnan et al., 2013). Sufficient evidence exists to warrant exploring methods of ensuring children with sickle cell disease get preferential immunization with PCV as an interim preventive measure (McGregor et al., 2004; Trotman et al., 2009; Hardie et al., 2009; Piel et al., 2013; Mackenzie et al., 2012).

Conclusion

This study finds that there are clear predictors of PCV uptake but further research is needed to examine other factors that have the potential to influence the universal adoption of PCV (Sohn et al., 2010; Mackenzie et al., 2012). Improving the knowledge of parents and caregivers needs to be more actively pursued for as long as babies are being born with SCD. The authors recommend the adoption of an active surveillance system to generate information that will serve to assist the implementation of routine PCV in national immunization programmes.

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Full Length Research Paper

The effect of maternal body mass index on the delivery route in nulliparous women

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Body mass index (BMI) is widely used to categorize the degree of obesity and to guide recommendations for weight gain during pregnancy, to examine the relationship between the maternal body mass index of nulliparous women and the route of delivery in a sample of Iranian Kurdish women, a cross sectional descriptive study was conducted, at Beasat Hospital in Sanandaj, the capital of Kurdistan province, west of Iran. The study sample consisted of 980 nulliparous women with spontaneous labor. Results showed that there is a significant association between cesarean section and higher maternal BMI. The cesarean section rate rose from 30% in women with normal BMI to 56% in the women with $BMI \geq 35$. Overweight women should be given information about risk of cesarean section before conception and be encouraged to reduce their weight.

Key words: Body mass index, cesarean section, nulliparity.

INTRODUCTION

Body mass index (BMI) is used to measure obesity and it is defined as the ratio of body weight in kilograms divided by the square height in meters (World Health Organization, 2000). BMI is widely used to categorize the degree of obesity and to guide recommendations for weight gain during pregnancy (Bell et al., 2011). Obesity is an epidemic not only in developed countries but also in the developing world. Furthermore, obesity is becoming an increasingly common problem, both in general population and in women of the reproductive age (Catalano, 2007). There is a growing body of evidence suggesting that obese pregnant women are at greater risk of a number of maternal and fetal complications of pregnancy, including pre-eclampsia, cesarean section intrauterine death (Cedergren, 2004; Dempsey et al., 2005), induction of labor and anesthetic complications (Robinson et al., 2005). Heslehurst et al. (2007) conducted a systematic

review to ascertain the impact of BMI on pregnancy outcomes. The results indicate that labor complications in heavier women may lead to cesarean births.

Despite the abundance of research investigating pregnancy outcomes in obese women, no study has been done regarding this issue in Kurdish women. Therefore, we aimed to examine the relationship between the maternal BMI of nulliparous women and the route of delivery in Sanandaj, Northwest Iran.

MATERIALS AND METHODS

This cross sectional study was conducted at Beasat Hospital in Sanandaj. Nine hundred and eighty nulliparous women with a spontaneous of labor were enrolled. Written informed consent was obtained from the participants. We included term primigravida women with a singleton fetus and cephalic presentation who were

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Table 1. Maternal, fetal, and labor characteristics of the study population, with crude CD rate.

Variable	No.	%	Crude CD rate, %
First-trimester BMI, kg/m²			
<25	556	56.7	30.9
25- <30	317	23.3	36.0
30-<35	88	9.0	40.9
>35	19	1.9	56.9
Mean \pm SD	24.7 \pm (4.06)		
Maternal age			
<20	151	15.4	23.8
20-24	400	40.8	27.3
25-29	303	30.9	41.6
30-34	99	10.1	46.5
>35	27	2.8	59.3
Mean \pm SD	24.4 \pm (4.7)		
Oxytocin			
No	477	48.7	36.9
Yes	503	51.3	31.2
Origin			
Rural	348	35.5	27.3
Urban	632	64.5	37.7

willing to participate. The exclusion criteria were pre- and post-term labor, fetal distress and disproportion of the pelvis and head. Maternal height and first-trimester weight, as written in the patients' medical records, were used to calculate BMI. It was calculated for each patient by using the formula kg/m². The women were grouped into four categories with respect to their BMI: normal (< 25), overweight (25 \leq 30), obese (30 \leq 35) and morbidly obese (\geq 35) (World Health Organization, 2000). Data regarding the patients' demographic and labor characteristics including maternal age, educational level, place of residence (urban versus rural), oxytocin induction of labor (yes/no) and mode of delivery (vaginal versus caesarean section) were obtained (Table 1).

Data were analyzed using statistical package for social sciences (SPSS) software, version 18. A P value < 0.05 was considered as statistically significant. Descriptive analysis and multivariable regression was used to calculate odd ratios (OR) with 95% confidence intervals (CI).

RESULTS

The study sample consisted of 980 singleton pregnancies in nulliparous women. The mean age of the women was 24.4 \pm 4.7 years (range: 16 to 40 years). Six hundred and thirty two (64.5%) women lived in urban area. 873 (80%) had a BMI < 30. 88 (9%) women were obese, with a BMI between 30; 35, and 19 (1.9%) women were morbidly obese with a BMI \geq 35. Overall, 583 (59.5%) women had

vaginal deliveries and 397 (40.5%) had unplanned cesarean births. A significant association between cesarean section and higher maternal BMI was found. The cesarean section rate rose from 30% in women with a normal BMI to 56% in women with a BMI \geq 35 (Table 1). In the logistic regression model, the OR for all cases of cesarean delivery increased significantly from 1.0 to 3.1 (95% CI: 1.21 to 7.78) within the same two groups of women. For 51.3% of the deliveries, oxytocin was used to induce labor. The cesarean section rate was 31.2% in the women with oxytocin induction; while in women whose labor was not induced with oxytocin, the cesarean section rate was 36.9% ($p < 0.05$).

The rate of cesarean section also increased from 41.6% in women 25 to 29 years of age to 59.3% in women > 35 years of age (Table 1). In the logistic regression model, the OR for all cases of cesarean delivery increased significantly from 2.3 to 4.6 (95% CI: 1.98 to 10.9) within the same two groups of women. It was found that an increase in BMI increased the risk of cesarean section for suspected fetal distress (SFD). The OR for fetal distress rate increased from 1.0 in women with a normal BMI to 3.18 in women with a BMI \geq 35. In the logistic regression model, the OR for SFD cesarean delivery increased but not significantly from 1.0 to 3.18

Table 2. Risk for cesarean delivery in total, due to suspected fetal distress or failure to progress in spontaneous labor, at term with a single cephalic presentation.

Variable n=980	CD due to FTP		CD due to SFD		CD in total	
	95% CI	OR	95% CI	OR	95% CI	OR
First – trimester BMI, kg/m²						
25	1.0		1.0		1.0	
25-30	1.28	0.82-2	1.92	1.23-9	1.2	0.94-1.68
30-35	0.84	0.37-1.91	2.86	1.55-5.28	1.54	0.98-2.45
35	2.6	0.83-8.07	3.18	1.0-10.0	3.1	1.21-7.78**
Maternal age, years						
20	1.0		1.0		1.0	
20-25	1.02	0.55-1.86	1.6	0.65-4	1.2	0.78-1.86
25-30	0.83	0.43-1.59	5.4	2.52-12.76	2.3	1.47-3.53**
30-35	1.2	0.53-2.58	5.4	2.05-14.07	2.8	1.61-4.78**
35	0.68	0.15-3.12	4.2	1.1-16.0	4.6	1.98-10.9**
Origin						
Rural	1.0		1.0		1.0	
Urban	0.98	0.64-1.50	3.28	1.92-5.6	1.6	1.2-2.14**
Oxytocin						
No	1.0		1.0		1.0	
Yes	27.9	10.1-76.5	0.39	0.26-0.60	0.77	0.59-1.02

Odds ratios and 95% confidence intervals are mutually adjusted all variables in the model. BMI, body mass index; CD, cesarean delivery; CI, confidence interval; FTP, failure to progress; OR, odds ratio; SD, standard deviation; SDF, suspected fetal distress.

(95% CI: 1.0 to 10.0) within the same two groups (Table 2). Furthermore, with respect to failure to progress in labor (FTP), the OR increased from 1.0 in women with a BMI normal to 2.6 in women with a BMI \geq 35. In the logistic regression model, the OR for FTP cesarean delivery increased even not significantly from 1.0 to 2.6 (95% CI: 0.83 to 8.07) within the same two groups (Table 2).

DISCUSSION

Obesity is an epidemic not only in developed countries but also in the developing world. Our findings suggest that an increased BMI is associated with an increased risk of perinatal complications, including cesarean section. These findings are consistent with other studies (Bergholt et al., 2007; Graves et al., 2006; Mantakas and Farrell, 2010; Kominiarek, 2010; Vahratian et al., 2004). Ehrenberg et al. (2004) showed that obesity exerts significant influence on the route of delivery.

In this investigation, we restricted our population to nulliparous woman at term to ensure a homogenous group

as possible. The risk of cesarean section increased from 30.9% in women with BMI < 25 to 56.9% in women with BMI \geq 35. This is consistent with a prior study including 6509 nulliparous women that showed the cesarean section rate rose from 18.2% in women with a normal BMI (20 to 25) to 40.6% in the morbidly obese women (BMI > 40) (Mantakas and Farrell, 2010). The exact causes of the increased cesarean section rates amongst obese women could not be identified from the obtained data and it was not possible to confirm exactly why obese women were experiencing more cesarean section. The increased cesarean section rate could be attributable to a variety of factors, including delay in the first stage of labor, unsuccessful induction of labor, fetal macrosomia, fetal distress and the obstetrician's decision.

Vahratin et al. (2004) studied the impact of BMI on the outcome of pregnancy. They found that labor progression in overweight and obese women is slower than women with a normal weight. In our study, an increase in BMI significantly increased the risk of cesarean delivery in total cases but not for suspected fetal distress and failure to progress cases when analyzing them separately.

According to Cnattingius et al. (1998), the presence of excess intra-abdominal adipose tissue itself could mechanically obstruct the progression of labor, contributing to a failure to progress. In addition, if progression of labor is mechanically obstructed, this could over time compromise feto-placenta circulation and cause fetal distress.

Zhang et al. (2007) found that the myometrium in obese women contracted with less force and frequency and had less Ca^{2+} flux than that of women with a normal weight. They concluded that obesity may impair the ability of the uterus to contract in labor. The exact mechanism of dysfunctional labor in obese women is not completely understood. Elevated cholesterol level has been shown to decrease uterine contractility, and obese women are more likely to have elevated cholesterol levels than women with a normal weight (Wray, 2007). This elevation in cholesterol may result in the higher incidence of dysfunctional labor in obese women and subsequent cesarean section.

In this study, the increased risk of cesarean section in obese women could also be a consequence of difficulty and lack of facilities for accurate monitoring of the progress of labor and fetal condition in our center. Without accurate monitoring of progression in labor, the risk of cesarean section may have increased. Moreover, the outcomes may have been influenced by differences in the decision-making processes leading to detected progress of labor and the monitoring of obese woman among different obstetricians. Another contributing factor to the increased cesarean section rate was maternal age. Maternal age of more than 30 years was found to increase the chance of a cesarean delivery. Bergholt et al. (2007) also found an association between maternal age and cesarean delivery. According to Toro et al. (2002), the physiological mechanism resulting in efficient uterine action in nulliparous women could be affected by maternal age. This could be the result of increased incidence of anatomical age-related alteration in uterine contractility.

The most important finding of our study was the cesarean rate (41%) in 980 births in our center which is different from WHO standards and recommendations (2008). This finding confirms the importance of understanding the causes or contributing factors and presenting approaches for avoiding or reducing cesarean section. Studies show that obese and overweight women were more likely to be induced and required a cesarean section compared with women with a normal BMI (Athukorala et al., 2010; Demont-Heinrich et al., 2009; Kominiarek et al., 2010; Mantakas and Farrell, 2010; Park et al., 2011).

In contrast to another study, the findings of the present study showed that the rate of cesarean section was lower in the women whose labor was induced. This may be related to the obstetrician's decision for cesarean section before using oxytocin for induction. One of the limitations

of the study was the insufficient number of morbidly obese women ($n = 19$) to analyze the effects of morbid obesity separately. Moreover, there is the failure to collect reliable data on the indication for cesarean section. It would be valuable to explore how the indications for cesarean section in obese women compare with those of women with a normal weight.

In the present study, the authors found a correlation between the delivery route and increased BMI which could be important from a clinical point of view concerning the management of vaginal deliveries among overweight, obese and morbidly obese women. Therefore, overweight women should be given information about risk of cesarean section before conception and be encouraged to reduce their weight.

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Full Length Research Paper

New normal in violence: Perspectives on US Gulf Region (New Orleans) post-disaster recovery

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Violence is a public health risk and important concern for stakeholders in disaster-vulnerable Gulf region of the United States. Disaster-prone communities like New Orleans have recorded a higher rate of violence (violent and property crime) and this experience is potentially becoming a 'new normal' for the residents and the community as a whole. The concept of new normal in individual and community resilience is an important subject in recovery from disasters and adverse events. This paper reviews various factors which can help individuals and community to bounce back from traumatic events and also evaluates the mental states that adversely affect the general condition and psyche of the affected people post-disasters. While there are no formulas that can relieve the stress and adverse impact of violence and trauma, the paper tries to highlight the important positive mental states and attitudes that may help in dealing effectively with post-disaster grief feelings and bouncing back from adversities.

Key words: Disaster, traumatic, new-normal, bounce-back, New Orleans, resilience, positive mentality, victims, affected people, violence.

INTRODUCTION

Violence is a public health issue that is fast becoming a major concern for all the stakeholders (Haegerich and Dahlberg, 2011), especially in disaster-prone communities in the Gulf of Mexico of United States (Dembert and Simmer, 2000; DeSalvo et al., 2007; Dimanche and Lepetic, 1999). Statistics have shown that disaster, among other factors, contributes to various spates of instabilities that have been witnessed in various communities in the US Gulf Coast. With respect to New Orleans, a city that is recovering from one of the most destructive natural disaster (hurricane Katrina) in the history of United States, the increased rate of violence is a source of concern for the residents, as well as millions of tourists that visit the city on daily basis (Dembert and Simmer, 2000; DeSalvo et al., 2007; Dimanche and Lepetic, 1999; Fullerton et al., 2003; Hawkins and Maurer, 2011). The year 2013 has been a relatively better year for the crescent city in terms of property and violent crimes.

According to the data produced by the cityrating.com, the crime statistics in New Orleans should be taking a downward trend when compared to the previous statistics for the previous 11 years (Tables 1 and 2). In fact, the crime rate for 2013 is expected to be significantly lower than that of year 2010 (Figure 2), a year in which the violent crime rate was more than the national violent crime rate average by above 80% (Figure 1). The property crime rate was equally higher in New Orleans than the national property crime rate average by more than 21% (Figure 1). Also, in 2010, the violent crime rate for New Orleans was higher than the violent crime rate in the state of Louisiana by approximately 33% (Figure 4), while property crime rate was lower than the state's by approximately 3% (Figure 3).

"New Normal" is a concept that is mentioned repeatedly in discussion about community resilience following disasters in the Gulf Coast region (Abrams et al., 2004; Colten

Table 1. New Orleans crime statistics summary report.

2010 Crime (Actual data)*	Incidents
Aggravated assault	1,321
Arson	N/A
Burglary	3,695
Forcible rape	144
Larceny and theft	6,540
Motor vehicle theft	2,410
Murder and manslaughter	175
Robbery	953
Crime rate (total incidents)	18,576
Property crime	12,645
Violent crime	2,593

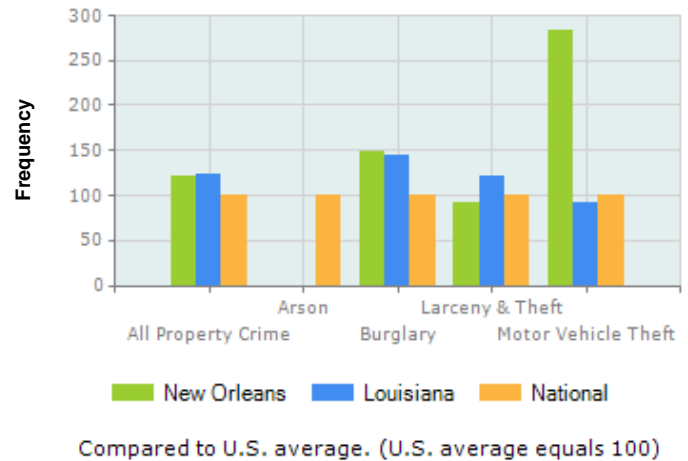


Figure 2. 2010 New Orleans property crime comparison. Source: CityRating.com – <http://www.cityrating.com/crime-statistics/>

Table 2. New Orleans crime statistics summary report 2013

2013 Crime (Projected data)*	Incidents
Aggravated assault	902
Arson	0
Burglary	3,586
Forcible rape	46
Larceny and theft	1,411
Motor vehicle theft	0
Murder and manslaughter	155
Robbery	118
Crime rate (total incidents)	10,546
Property crime	4,615
Violent crime	1,221

Source: (c) 2013 Cityrating.com-<http://www.cityrating.com/crime-statistics/>

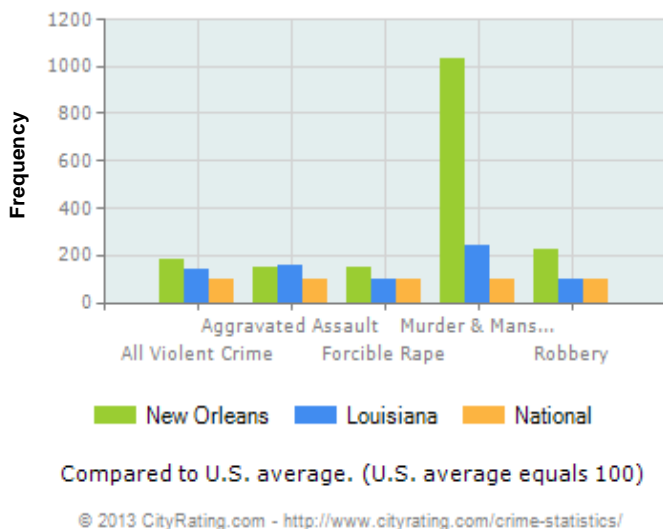
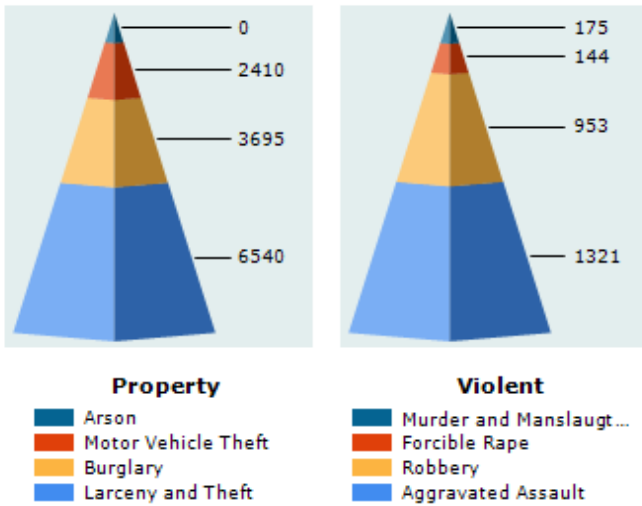


Figure 1. 2010 New Orleans violent crime comparison.

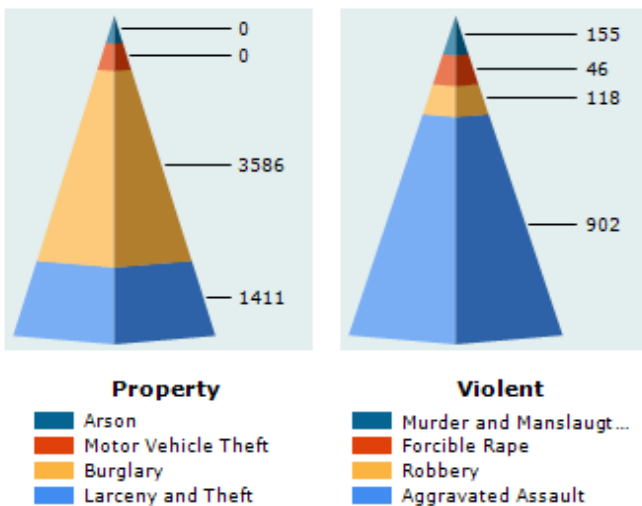
et al., 2008; Norris et al., 2008; Norris et al., 2008; Rhodes et al., 2010; Smoyak, 2006; Steury et al., 2004). Different spates of disaster and calamitous events befalling a community can have a potentially could have a long lasting adverse impact on the healthy and social well-being of the residents of these communities. These disasters could be in the form of a personal traumatic event affecting an individual in a family or a communal adverse event affecting group of people within the community with the same common interests. Overall, these events leave behind indelible scars in the lives of the affected people. How well the respective individual or community fares depend on their coping mechanisms and the resources available at their disposal to positively activate these mechanisms (Dembert and Simmer, 2000a; Dembert and Simmer, 2000b; Peacock et al., 2007; Rodriguez et al., 2006; Tak et al., 2007; Williams et al., 1999).

Most experts and specialists in the field of community resilience, crisis intervention and disaster management have conducted, analyzed and reported several findings on the resilience of the people and the resources available for community to build back after a disaster, be it man-made or natural (Armour, 2002; Boin and McConnell, 2007; Colten and Sumpter, 2009; Curtis et al., 2010; Hawkins and Maurer, 2011; Jonkman et al., 2009; Leavitt and Kiefer, 2006; Luft, 2009; McCarthy et al., 2006; Norris et al., 2008a; Norris et al., 2008b). However, further studies are needed to be conducted to analyze these resilient factors based on the reactions and feelings of the victims and not only from the prism of the conventional societal postulations on disaster recovery. society (Adams et al., 2009; Aldrich and Benson, 2008; Chamlee-wright and Storr, 2009; Eisen, 2002; Fullerton et al., 2003a, b).

In as much as being resilient and bouncing back from a disaster or traumatic event depicts positive reaction and



(a)



(b)

Figure 3. (a) New Orleans 2010 crime and (b) 2013 crime (projected).
 Source: CityRating.com – <http://www.cityrating.com/crime-statistics/>

response to these events, it is important to emphasize that situations or status-quo might not be as the same again (Abrams et al., 2004a, b; Aldrich and Benson, 2008; Cefalu et al., 2006; Eisen, 2002a, 2b; Osofsky, 2008a, b; Smoyak, 2006a, b). Situations might become better or worse, but the status quo can only be imagined or lived in the memory. Especially if the traumatic event is as a result of human negligence, wickedness or a man-made disaster, then it might take some time for the wound to heal, even after measures are put in place to

prevent re-occurrence (Hawkins and Maurer, 2011; Osofsky, 2008; Procopio and Procopio, 2007; Rodriguez et al., 2006).

However, several studies have shown that healing might be easier to activate when the traumatic event is due to a natural disaster and not a man-made or man-inflicted disaster (Smoyak, 2006; Steury et al., 2004; Tanaka, 1996; Tierney, 2007). Victims tend to ask questions (sometimes after a long period after the occurrence of the disaster) querying the occurrence of the event in the first place, even after several mitigation plans and relief measures have been put in place to reduce the casualties and fatalities following the disaster (Abrams et al., 2004; Luft, 2009; Silver et al., 2011; Smoyak, 2006; Tak et al., 2007; Williams et al., 1999).

This article focuses on reactions of affected people post-disaster in the gulf coast region, concentrating on the ways they have adjusted their lives and mental beliefs relative to the disaster. In addition, this paper attempts to answer some important questions (1) Will things ever be the same again after a traumatic event? and (2) What are the effective ways and appropriate mental states of responding to unpleasant and traumatic events? (Aldrich and Benson, 2008; Armour, 2002; Green et al., 2007; Kronenberg et al., 2010; Williams et al., 1999). These lingering questions are the reasons the concept of new normal is very important during discussion and counseling of victims and communities that have witnessed traumatic events and large scale disasters with a resultant violent episode in one form or another.

The goals and expectation of all the stakeholders following disaster and violence care for circumstances to normalize and become better. However, in some cases, especially among people with fatality outcome, situation might become worse, resulting in varying clinical symptoms of anxiety, fear, *Post-traumatic stress disorder* (PTSD) and different forms of psychiatric disorders depending on the effect and impact of the events on their psyche, well-being and mental functioning (Kronenberg et al., 2010; Osofsky, 2008; Silver et al., 2011; Tak et al., 2007; Tanaka, 1996).

There is the need for the counselors and the stakeholders to ensure that the concept of new normal in violence is included in the discussion when they hold sessions with victims and discuss the subject of resilience with communities (Kiefer and Montjoy, 2006; Leavitt and Kiefer, 2006; Li et al., 2010; Smoyak, 2006). Communities need to be informed and counseled on the importance of moving on from the memories and stigma of the traumatic experiences. They need repeated encouragements as they gradually face the stark realities of the consequences of these adverse events on their mental orientation and psyche, which by all means is not a very easy state of mind to achieve. (Luft, 2009; McCarthy et al., 2006; Olshansky et al., 2008; Osofsky, 2008)

Sometimes, the cases of PTSD and anxiety disorder

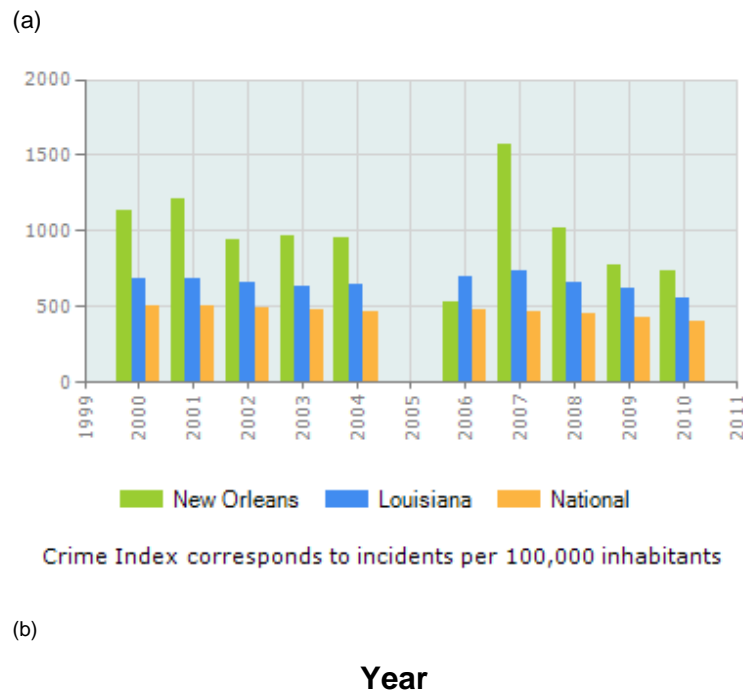
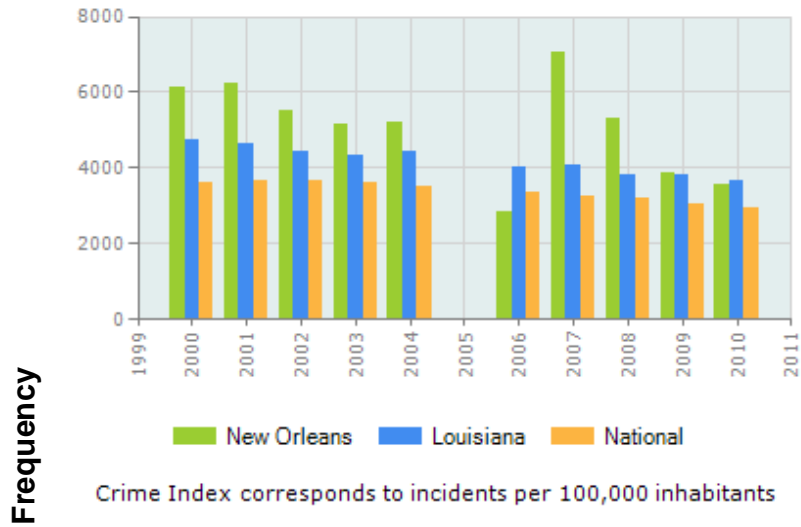


Figure 4. (a) New Orleans property crime index and (b) violent crime index.

abound because people affected adversely by violence cannot grapple with the concept of facing the reality after the events. People are so used to their ways of life or having their loved ones around them, that it becomes very difficult to fathom a life without them, more so, if they were violently taken away from them. This, sometimes becomes very difficult for the affected people to adapt to and move on without their loved ones to start a new life different from what they are used to in the past before the violence (Airriess et al., 2008; Corrigan, 2008; Osofsky, 2008a, 2008b; Williams et al., 1999a, b). There have

been cases of violence where victims and affected people have declared 'that was not what it used to be before the disaster struck', or 'they cannot imagine life without their loved ones'. In as much as these are facts, counselors need to let them realize the current facts and realities as well. Affected people need to know "that those thoughts about the past cling them to the past, and they have to change their orientations and think of the present and the future with a focus on how they can make the best use of the opportunities (Congleton, 2006; Dunlap et al., 2007; Harrald, 2006; Williams et al., 1999).

The hard truth remains that no communities or individuals ever wish the occurrence of adverse events, but when these events do happen, victims have to project positively and endeavor to live with it and make the best of the situation (Abrams et al., 2004; Armour, 2002; Eisen, 2002; McCarthy et al., 2006; Silver et al., 2011; Sobel and Leeson, 2010; Tierney, 2007).

No doubt, these are easier said than done, but it is the reality with which affected people have to live with post-disaster and post-violence, if they want to advance from the doldrums of regrets and shackles of anxiety and become more optimistically focused on a new dawn of reality and hope (Peacock et al., 2007; Procopio and Procopio, 2007; Quarantelli, 2005; Williams et al., 1999)

When people are encouraged and advised to face reality and become pragmatic post-violence, it is akin to transporting them to a new environment where they have to start all over again without any supporting resources and this in itself can be a form of stress in their recovery phase and efforts. But counselors need to emphasize these choices to people pre-disaster and the earlier they can attune themselves to these ideas, the easier and better it will be to apply, cope and adapt into the new life, a post-violence life (Abrams et al., 2004; Cigler, 2007; Colten et al., 2008; Harrald, 2006). The concept of new normal is important as an integral component of communities' resilience in that it utilizes all the resources needed and available for bouncing back from violence and adapting into a new reality of life in the community (Boin and McConnell, 2007; Boin, 2009; BondGraham, 2007; Chamlee-wright and Storr, 2009; Cigler, 2007; Norris et al., 2008). Several factors and principles have

been put forward to help communities and individuals embrace the concept of new normal as a positive tool for healing following a traumatic event and violent experience. However, it is difficult to generalize these factors and principles because communities and individuals do not react to the same situations with the same response. But some cogent points still need to be outlined as recipe for or bane of healing, depending on the reactions of people post-violence (Armour, 2002; Dunlap et al., 2007; Elliott et al., 2010; Jonkman et al., 2009; Kronenberg et al., 2010; Silver et al., 2011; Tanaka, 1996).

Self-forgiveness

As humans, people are prone to making mistakes occasionally as they go about their daily activities. Some of these mistakes could be as a result of the decisions that were made directly by them (victims) or indirectly made by others and come back to affect them (affected people) (Armour, 2002; Harrald, 2006; Nigg et al., 2010). It is a more difficult burden and more traumatic when these decisions result in adverse events which may potentially affect them directly or indirectly. Most of the time, people find it difficult to forgive themselves and live

with the question of 'should have, would have and could have' for the rest of their lives (Leavitt and Kiefer, 2006; Li et al., 2010; Litman, 2006; Silver et al., 2011; Tak et al., 2007). These attitudes have the tendency to hinder the process of healing following adverse events (Armour, 2002; Cefalu et al., 2006; Fullerton et al., 2003).

Self-condemnation and self-guilt worsen the grieving periods and if not taken care of adequately, can transition to acute stress disorder and eventually post traumatic stress disorder (PTSD) (Adams et al., 2009; Boin, 2009; Fullerton et al., 2003). Different literatures have shown that self-condemnation aggravates the phases of grieving and prevents individuals and communities from bouncing back adequately post-disaster and after a violent experience (Armour, 2002; Fullerton et al., 2003; Kronenberg et al., 2010; Olshansky et al., 2008; Silver et al., 2011). When traumatic events occur, looking back on the decisions that resulted in the event should only be because of a re-assessment and analysis, with the goal of using the result as tools to bounce back from the adverse event. Conversely, the introspection should not be used as an avenue to plunge further into abyss of self-condemnation and guilty conscience. Self-forgiveness also offers a unique internal resource to heal the psyche of the victims' sordid past, re-orient the mind-set to face the reality and position the shattered mentality to accept the resultant reality after the violence. It also helps to heal the wound of the mind and confront without shame, any regret that may come up during the healing process (Armour, 2002; Curtis et al., 2010; Fullerton et al., 2003).

The blame game

People tend to find answers to knotty situations in life by identifying the culprit in order to ascribe the blame on them. Sometimes, this gives solace to people's quest when answers are matched with troubling question of 'why us? or why me?'. These feelings of arriving at answers have the tendency to bring closure to adverse events, especially when these events are least understood. Most of the times, when people do not know what is going on or happening to them, they look back and start to blame others as the culprit for the adverse events (Armour, 2002; Dembert and Simmer, 2000; DeSalvo et al., 2007; Silver et al., 2011; Tak et al., 2007; Williams et al., 1999). Sometimes these notions are true especially with man-made disasters and violent crimes, otherwise they are hard to fathom in cases of natural disasters. Blaming oneself or others sometimes can be a form of hindrance to healing from violence and other adverse experiences. With respect to man-made disaster, especially in cases where the culprits have not been identified, affected people feel that justice has not been served until the cases are solved, thus living with hurt feelings for a long time, as long as the cases are still ongoing and until they feel justice has been served. Closure

is a positive feeling, because it enables affected people to move past the adverse events and move-on with their lives (Abrams et al., 2004; Armour, 2002; Eisen, 2002). Counselors should be wary of classifying physical-cum societal closure with the mental-cum mind closure. They are absolutely different. The latter proffers more benefits to the victims and it is more important as it helps healing and rebuilds a confident mentality. This which can help the affected people overcome grief and move towards focusing on the positive aspects of the present and the future (Abrams et al., 2004; Osofsky, 2008; Smoyak, 2006).

Accepting the situation

This is one of the most difficult things to do after the occurrence of adverse events. People often ask these popular questions of ‘why me?’, ‘where do we go from here?’ or ‘where do we start from?’. Relative to experiencing the pain of adverse events, the concept of new normal can serve as a new vista for clients to transcend into a new life. Accepting the situation is an integral component of the concept of new normal, as it entails accepting and substituting the new situation as a replacement for the status quo and looking forward to the future with a renewed hope (Abrams et al., 2004; Eisen, 2002; Williams et al., 1999). Sometimes, people who accept the reality end up becoming better in managing adverse situation and can become more successful as individual or community than they might have been or planned to be with their conditions pre-disaster. Though different people have different results from accepting their new post-disaster situation and experience, generalization might be difficult as a result of availability and utilization of resources, and the internal milieu of the victims. However, many lessons might be learnt from the confidence and attitude with which successful people have turned their adverse experiences and backgrounds to enviable assets and lifestyles in the community (Abrams et al., 2004).

Change what you can and live with the rest

This is similar to the ‘accepting the situation’ mentality only that some conditions and situations after the experience of a violent episode are not final; the damage can still be mitigated and in some cases reversed to the preferred pre-disaster state. In these peculiar instances where reversal is a possibility and preferred, it is advisable for the affected people to strive towards achieving the preferred state so that they do not live to regret their decisions of decline or giving-up attitude in the future (Eisen, 2002). However, if the pre-disaster condition is unattainable, then there is no point grieving over what cannot be changed, the victims will have to adopt and embrace the post-disaster situation as the new normal and live with it. The feeling that ‘we did everything

possible or tried our best’ sometimes offers closure to the grieving individual and community. This can help to accelerate the process of healing and transitioning from the adverse experiences into the preferred future (Eisen, 2002).

Sharing thoughts with others in similar situation

In order to fully comprehend and accept the concepts of new normal in violence, affected people need to understand that their situations are not peculiar and unique to themselves alone. Several people across the globe and sometimes in their immediate neighborhoods might have experienced similar circumstances, are going through or will go through the same, similar or even worse situations than they are going through or experiencing presently (BondGraham, 2007; Dembert and Simmer, 2000; Williams et al., 1999). Knowing this reality offers some reassurances that they are not alone in their plights and can find solace by sharing their experiences with others. When they find this cohort with similar adverse experiences and are able to share their thoughts from a different perspective as peculiar to their situations, studies have shown that affected people thrive better from the encounter and heal faster. They receive encouragements just by the hearing from and listening to other affected people having a sense of belonging that some other people out there actually understand their current plights and states of mind (Williams et al., 1999). Sometimes, the stories can be shameful and difficult for the affected people to share, especially when they blame themselves as responsible for the violent adverse events.

Counselors need to encourage the affected people and victims to look beyond their senses of shame and guilt and bare their thoughts without any form of condemnation, so as to allow their healing process to begin on time and proceed without alterations (Fullerton et al., 2003a, b). This approach is effective where there is a robust social and family support and understanding. Having someone or a cohort who understands their situations also confers a form of insurance to the affected people, because they can consult with them during the process of healing, especially during those times when relapses into the past seem incessant, uncontrollable and going forward becomes difficult (Hawkins and Maurer, 2011; Jonkman et al., 2009; Osofsky, 2008; Rhodes et al., 2010).

Finding strengths from others’ stories and experiences

Sometimes, affected people can learn from instructions in addition to learning from previous experiences. When it is not feasible for the affected people to find a cohort they can share their thoughts with, counselors can encourage them to use other resources in different media to learn

from similar stories or the same stories expressed in different perspectives, as these sources can be a conduits for them to find strengths and rays of hope in their situation post-violence and disaster (Abrams et al., 2004; Corrigan, 2008; Curtis et al., 2010). Some-times, it is difficult for affected people to have the initiative and fortitude to advance following traumatic experiences; however results from different studies and researches by experts can offer concrete ideas that have been proven and tested to help people in difficult situations overcome their moments of sadness and move-on with their lives (Cefalu et al., 2006; Williams et al., 1999). The new normal in violence of other people already documented in the media can inspire the new normal for people who are currently experiencing similar situation. The goal of new normal concept is to prescribe for the affected people the better alternatives and options of moving on and living peacefully following adverse events (Abrams et al., 2004; Chamlee-wright and Storr, 2009; Harrald, 2006). Nevertheless, when there are no supports and reassurances that this concept of 'new normal in violence' is pragmatic and effective, the entire efforts can end up in futility, as the affected people might not see any reasons or connections to continue and be positive-minded following a traumatic or violent experience (Dembert and Simmer, 2000; DeSalvo et al., 2007; Dunlap et al., 2007). Consequently, there is the need for consistency and patience on the part of the counselors to make sure that these people are carried along with the concept and that they understood the need to advance and transit to a better state from their grieving situation.

Overcoming the doctrine of fatalism

One of the beliefs that limit the inculcation of the concepts of new normal in violence is the tenets of fatalism or fate. This is a belief in which people conclude that 'change is beyond them' and 'what will happen will definitely happen' and 'they cannot do anything about it'. People with this belief believe they are powerless in determining their fates and well-being (Jonkman et al., 2009; Rhodes et al., 2010; Steury et al., 2004; Tanaka, 1996). This belief contradicts the principles of new normal and invalidates the need for affected people to move on with the hope of making the best opportunity of their new condition post-disaster. When the affected people operate with this mentality, they deny themselves the opportunity of turning their adverse conditions into a better experience that can be beneficial to them, their loved ones and the society in general. Fatalism is just a way of saying that the affected people are helpless and hopeless as nothing good can come from their adverse situations, other than waiting for another wind of tragedy to blow their way irrespective of their aversions to these events (Osofsky, 2008; Tanaka, 1996; Tierney, 2007). But on the contrary, cases of better times and days have

been documented over the span of human existence following different adverse events and various hopeless situations have metamorphosed into inspirational tales when affected people re-oriented themselves and refused to be defined by the adverse events. (Abrams et al., 2004; Boin, 2009; Li et al., 2010; Norris et al., 2008). So, there is the need to encourage affected people post-disaster to be optimistic about their situations and cling to the positive attitude of achieving their hopes and aspirations in life, no matter how terrible and traumatic the adverse event. Every person wants to be happy and have peace of mind, but the belief that people are powerless does not bring happiness nor does it give a lasting peace to the mind, the reason the concept of new normal and its positive tools need to be elaborated so that affected people and communities can utilize its tools to bounce-back following traumatic and violent experiences (Kronenberg et al., 2010; Norris et al., 2008; Sobel and Leeson, 2010)

Developing a positive perspective to life

This is an important principle in the concept of new normal in violence. It is the bedrock and foundation of the new normal concept. It is the sole reason why affected people conclude that they can give life a second shot or that they deserve a second chance depending on the circumstances, irrespective of what they have passed through in the first place or faced in the not too distant past (Abrams et al., 2004; Osofsky, 2008; Smoyak, 2006). It is an attitude that declares that the past experiences do not define them, rather, they define their lives based on the new choices and decisions they take and make following a traumatic experiences and post-disaster. This attitude is the engine that utilizes all the other factors and combines them as a component in availing the affected people the best options of bouncing back post-disaster. It is also the trigger for living with the new normal principle as a tool to adapt to the new situation following deleterious and violent experiences. Having positive mentality helps the principle of new normal to thrive and become actualized (Armour, 2002; Eisen, 2002; Elliott et al., 2010; Fullerton et al., 2003). The alternative is not an option as it worsens the conditions of the affected people and can translate into more moribund complications which will require more resources to manage. So, it is the onus of the stakeholders to stress these important factors to the people following adverse events. It is a viable choice of adapting into the reality and effective in commencing the healing process (Armour, 2002; Smoyak, 2006; Steury et al., 2004). A limitation of this perspective was the inability to conduct a statistical analysis to highlight the associations between crime and violence indices between New Orleans, state of Louisiana and the national data. This is because the exact state and national records were not available at this

time. Future research will include detail analysis of the rate of violence in the city and a comparison with the rate in other big cities across the country.

Conclusion

The concept of new normal in violence is important and valuable especially in a city like New Orleans with a considerable high rate of property and violent crime. This is necessary and important in breaking the jinx and trends of incessant and unnecessary violence, especially on the background of previous violence, a popular premise for violence in the city. It is also helpful in the discussion relating to community resilience and it should be given more emphasis when discussing resilience following a traumatic or disastrous event (Abrams et al., 2004; Smoyak, 2006; Williams et al., 1999). With all the aforementioned tools, the concept can become vital resources for affected communities and people in bouncing back from their adverse experiences into a profitable and benevolent future. This concept entails the belief that situations can become better and that all hopes are neither dashed nor lost following adverse events (Abrams et al., 2004; Armour, 2002; Boin and McConnell, 2007; Williams et al., 1999). Nevertheless, it stresses and imbues the ability to assess situations as they are and concentrate on the positive elements with a renewed hope for a better future. It is a second chance principle and opportunity that will be beneficial to the affected people, because it helps them to navigate their tumultuous present into peaceful future of hope and aspiration, irrespective of the scars from previous events (Abrams et al., 2004; Armour, 2002; Colten and Sumpter, 2009; Peacock et al., 2007; Quarantelli, 2005; Smoyak, 2006). A violence-free community is the right for every citizen and the responsibility of all the stakeholders. More importantly, the state of mind of the victims, if positive, can contribute significantly to the healing process

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UPCOMING CONFERENCES

10th International Meeting on Microbial Epidemiological Markers (IMMEM-10), Paris, France, 2 Oct 2013



The screenshot shows the website for the 10th International Meeting on Microbial Epidemiological Markers (IMMEM-10). The page features a navigation menu on the left with links for Overview, Scientific Program, Speakers, Online registration, Travel grants, Call for abstracts, Venue, Social program, Sponsors, Accommodation, Practical information, and Contact us. The main content area includes an overview of the meeting, its dates (October 2-5, 2013), and location (Institut Pasteur, Paris, France). It also lists important dates for registration and abstract submission. Logos for Institut Pasteur, ESCMID, and FEMS are visible on the right side of the page.

October 2-5, 2013
IMMEM 10
10th International Meeting on Microbial Epidemiological Markers (IMMEM-10)

Overview

10th International Meeting on Microbial Epidemiological Markers (IMMEM-10)

October 2-5, 2013
Institut Pasteur, Paris, France

The ability of microbes - bacteria, viruses, fungi and parasites - to mutate rapidly, disseminate and adapt to new hosts and environments, forces us to increase our capabilities for the early recognition of novel strains of pathogens, and to understand the factors that contribute to their diversity, evolution and dissemination. IMMEM-10 will address a variety of topics related to pathogen emergence, population-level diversity, evolution of virulence and antibiotic resistance, strain tracking, typing networks, public health and surveillance, novel typing approaches, high-throughput sequencing, genomics, and molecular epidemiology of infectious diseases.

The meeting will take place at Institut Pasteur, in the heart of Paris.

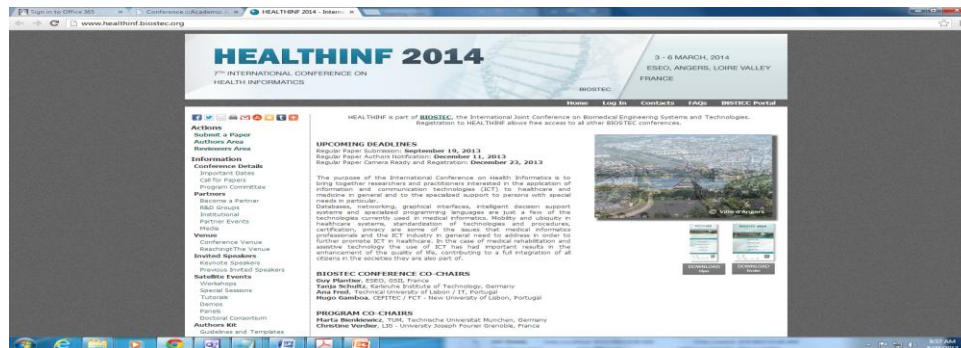
Important dates

- Early fee registration deadline: **June 30, 2013**
- Abstract submission deadline: **June 30, 2013**

Organizing Committee

- Sylvain Brisse (Institut Pasteur, Paris, France)
- Carmen Beckheiser (Institut Pasteur, Paris, France)

7th International Conference on Health Informatics, Angers, France, 3 Mar 2014



The screenshot shows the website for the 7th International Conference on Health Informatics (HEALTHINF 2014). The page features a navigation menu on the left with links for Actions, Registration Area, Information, Conference Details, Partners, Venue, Invited Speakers, Previous Speakers, and Abstracts. The main content area includes an overview of the conference, its dates (3-6 March 2014), and location (ESIC, Angers, Loire Valley, France). It also lists upcoming deadlines for abstract submission and registration. Logos for BISTEC and HEALTHINF are visible on the right side of the page.

HEALTHINF 2014
7th International Conference on Health Informatics

3-6 MARCH 2014
ESIC, ANGERS, LOIRE VALLEY, FRANCE

HEALTHINF is part of BISTEC, the International Joint Conference on Biomedical Engineering Systems and Technologies. Registration to HEALTHINF allows free access to all other BISTEC conferences.

UPCOMING DEADLINES

- Regular Paper Abstract Submission: **September 19, 2013**
- Regular Paper Authors Registration: **December 11, 2013**
- Regular Paper Camera Ready Submission: **December 23, 2013**

The purpose of the International Conference on Health Informatics is to bring together researchers and practitioners interested in the application of information and communication technologies (ICT) to healthcare and medicine in general and to the healthcare domain in particular. Database, networking, graphical interfaces, intelligent decision support systems, and embedded programming languages are just a few of the technologies currently used in medical informatics. Health and safety in healthcare systems, integration of technologies and procedures, interdisciplinary issues like ethics and legal issues, medical informatics professionals and the ICT industry in general need to address in order to further promote ICT in healthcare in the care of medical professionals and the enhancement of the quality of life, contributing to a full integration of all efforts in the sciences they are also part of.

BISTEC CONFERENCE CO-CHAIRS

- Ray Hightop, BISTEC, GISE, France
- Andreas Kuhlmann, Institute of Technology, Germany
- Paulo Faria, Technological University of Lisbon / FEUP, Portugal
- Hugo Gamboa, CEFITEC / FCT - New University of Lisbon, Portugal

PROGRAM CO-CHAIRS

- Baris Bekmelekci, GHI, Technische Universität München, Germany
- Christine Vaudet, LIS - University Joseph Fourier Grenoble, France

Conferences and Advert

January 2014

International Conference on Biological, Health and Environmental Sciences,
London, UK, 19 Jan 2014

March 2014

7th International Conference on Health Informatics, Angers, France, 3 Mar 2014

International Conference on Developmental Origins of Adiposity and Long-Term
Health, Munich, Germany, 13 Mar 2014

April 2014

Conference on Environmental Pollution and Public Health, Shanghai, China, 12 Apr 2014



Related Journals Published by Academic Journals

- Journal of Infectious Diseases and Immunity
- Journal of Diabetes and Endocrinology
- Journal of Medicinal Plants Research
- Journal of Cell Biology and Genetics
- African Journal of Pharmacy and Pharmacology
- Journal of Dentistry and Oral Hygiene
- International Journal of Nursing and Midwifery
- Journal of Parasitology and Vector Biology
- Journal of Pharmacognosy and Phytotherapy
- Journal of Veterinary Medicine and Animal Health
- Journal of Toxicology and Environmental Health Sciences
- Clinical Reviews and Opinions
- International Journal of Nutrition and Metabolism
- Journal of AIDS and HIV Research
- Journal of Cancer Research and Experimental Oncology
- Journal of Clinical Immunology and Immunopathology Research
- Journal of Clinical Medicine and Research
- Journal of Clinical Pathology and Forensic Medicine
- Journal of Medical Genetics and Genomics
- Journal of Medical Laboratory and Diagnosis
- Journal of Metabolomics and Systems Biology
- Journal of Neuroscience and Behavioral Health
- Journal of Physiology and Pathophysiology
- Medical Case Studies