

Baseline Socio-Demographic and Mortality Profile of a Peri-urban Coastal Community in Karachi, Pakistan Before the Introduction of a Comprehensive Maternal, Newborn and Child Health Intervention Package

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Research note

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Abstract

Objective

Pakistan has the highest neonatal mortality rate and one of the highest under-5 mortality rates in the world, at 42 deaths and 74 deaths per thousand live births respectively. We undertook implementation of an evidence-based maternal, newborn and child health (MNCH) intervention package to reduce under-five mortality in Rehri Goth, a peri-urban coastal community on the outskirts of Karachi, Pakistan. This paper aims to present the socio-demographic and under-5 mortality profile of Rehri Goth prior to implementation of the intervention package. We conducted a detailed census of all households on socio-demographic variables.

Results

Over the course of the census period, 6,962 households were visited. The total population of Rehri Goth was found to be 42,980. The male to female ratio was 52:48. Among adults aged 15 years and above, 67.1% had no formal education. The neonatal mortality and under-five mortality rates were 59 and 109 deaths per 1,000 live births respectively. Rehri Goth has a baseline child mortality rate that is higher than the national average in Pakistan. This provides an opportunity to deliver an evidence-based, targeted MNCH package to reduce child mortality.

Introduction

Globally, under-five mortality burden has fallen from 12.7 million in 1990 to almost 5.3 million in 2018. [1] The majority of these deaths have been averted by increasing coverage of simple, cost-effective interventions [2–5]. Perinatal complications and infections are amongst the top preventable causes of under-five mortality. (3, 5–8) About 45% of all child deaths are associated with malnourishment. (7, 9) Most of the deaths occur in Sub-Saharan Africa and South Asia, with about 50% deaths in China, Democratic Republic of the Congo, India, Nigeria and Pakistan. (10, 11)

Pakistan's under-five mortality has fallen from 139 deaths per thousand live births in 1990 to 79 deaths per thousand live births in 2016, (11) however, progress has been insufficient in relation to other countries in the region and has consistently lagged Pakistan's gross domestic product per capita indicators. [12] This has resulted in Pakistan missing its Millennium Development Goals (MDGs) targets for under-five mortality. Pakistan now has the third highest burden of under-five deaths in the world, with 403,638 deaths occurring in 2018. (13) Poor health infrastructure, lack of skilled care during pregnancy and delivery, suboptimal referral system, low immunization coverage, under-nutrition, poor health-seeking

behaviors, low literacy levels, and low status of women in society are leading causes contributing to the high under-five mortality rates in the country. (14, 15, 16)

In 2014, we began implementation of an evidence-based maternal, newborn and child health (MNCH) package to decrease under-five mortality in Rehri Goth, an impoverished peri-urban coastal community on the outskirts of Karachi. (17) This package included antenatal care and counselling for birth preparedness, promotion of skilled delivery, community health care for all newborns and infants, promotion of immunization, and family planning. (18) In this paper we aim to present the socio-demographic and child mortality profile of Rehri Goth prior to implementation of this evidence-based MNCH package. The child mortality estimates will serve as the baseline against which we will evaluate impact of our integrated package.

Main Text

Study Site

Rehri Goth is a fishing village spread over an area of 6.1 square kilometers and geographically divided into 45 different clusters. Each cluster comprises of an average of 250–300 structures, which are geospatially mapped. Department of Pediatrics and Child Health, the Aga Khan University has established a primary health center in the heart of community, which provides free of cost care to children under the age of five years. Figure S1 is map of the site.

Study Design

From March to April 2014, an independent consultant conducted a census of all households residing within the demarcated boundaries of Rehri Goth. A survey instrument was developed and translated into the local Urdu language for ease of administration. A 5-day training was conducted for 16 data collectors and 2 supervisors. Every household and person living in the community was enumerated. Information on age, gender and socio-demographic characteristics was collected. The supervisors checked all forms for completeness and consistency and sent forms with incomplete or inconsistent data back to the field for correction. Five percent of the households were revisited to validate the collected data. All the forms were double entered, and cross validation was done. All data were analyzed using Stata 12 and SPSS version 19.

Results

Socio-demographic characteristics

A total of 6,962 households were visited and 6,350 interviews were completed (91.2% response rate). The enumerated population was 42,980 with male to female ratio of 52:48. Figure 1 describes the population pyramid with age and gender distribution. Majority of the residents were Sindhi (51.8%) followed by

Pashto (16.9%) and Urdu-speaking (9.1%). Out of 24,149 adults aged > 15 years, 68.3% were married. Only 8.1% reported that they treated water before drinking. Out of these, 56.9% boiled drinking water, while 33.6% strained it through a cloth. Only 41% of the participants reported that they wash hands with soap after defecation, while 35.6% washed hands before preparing meals and 34.6% washed hands before eating. Immunization rates were also low, with only 23% of the children aged 12–23 months completing all three doses of Pentavalent vaccine. Most of the births had taken place at home or at unskilled facility in the presence of a traditional birth attendant (57%), with only 43% of births taking place at a skilled facility. Table 1 provides information on basic characteristics of the community.

Table 1
Basic demographic and other characteristics of
community

Ethnic distribution of the households (n = 6350)	
Indicator	N (%)
Sindhi	3291 (51.8)
Pashto	1074 (16.9)
Urdu	580 (9.1)
Bengali	454 (7.1)
Punjabi	413 (6.5)
Baluchi	238 (3.7)
Hindko	140 (2.2)
Saraiki	101 (1.6)
Others	59 (0.9)
Educational status of household members (n = 21650)	
No Formal Education/ Illiterate	16123 (74.5)
Pre -Primary (< 5 Years)	1146 (5.3)
Primary School (Up To 5 Years)	1256 (5.8)
Middle	969 (4.5)
Secondary	1276 (5.9)
Higher Secondary	599 (2.8)
Graduation and Above	281 (1.3)
Hand washing practices after defecation (n = 6350)	
With soap	2602 (41.0)
Water only	3474 (54.7)
Don't Wash	274 (4.3)

Mortality Indicators

There were 131 reported child deaths in 2013, based on prospective surveillance data from the project 'Aetiology of Neonatal Infections in South Asia (ANISA)', (19) and the census respectively. The Table 2 below shows data on live births, under-5 deaths, and mortality rates in Rehri Goth in 2013, with census

data as a comparison. Furthermore, 55% of the deaths happened during 0–27 days of the life, which highlights the need for targeted approaches to reduce neonatal and under-5 mortality. Table S1 is presenting percent breakdown of under-five deaths.

Table 2
Under-five death and mortality rate

	ANISA study 2012–2013 ¹⁹	Census 2014
Live births	1206	1233
Indicators	N (rate)	N (rate)
<i>Neonatal Deaths</i>	<i>72 (59.7)</i>	<i>52 (42.2)</i>
<i>Infant Deaths</i>	<i>110 (91.2)</i>	<i>91 (73.8)</i>
<i>Under-five Deaths</i>	<i>131 (108.6)</i>	<i>114 (92.5)</i>

Discussion

The baseline under-5 and neonatal mortality rates in Rehri Goth are 109 deaths and 59 deaths per thousand live births respectively, both of which are much higher than national average. Peri-urban slums such as Rehri Goth tend to have worse maternal and child health indicators than both rural and urban counterparts, given the poor reach of formal government healthcare and education services. (17, 20) There is an urgent need to develop service delivery models that are relevant for the peri-urban context. In light of this, the MNCH model that we propose to implement is comprehensive, coordinated, and integrated in nature, and targets the myriad of causes that contribute to the poor health status of peri-urban communities such as Rehri Goth, particularly focused on reducing the burden of neonatal deaths. It is our aim that demonstration of mortality reduction in such a community may provide a useful framework and operating model for effective service delivery in the peri-urban context.

The census reveals a population pyramid that is broader at the base and narrower at the top, which is common across developing country settings in the region and globally. Rates of immunization were significantly lower than national average, despite the presence of the Expanded Program of Immunization in the area. Many risk factors that lead to adverse health outcomes, such as low literacy percentage and poor hygiene behaviors, had high prevalence as reported in literature. (20) The strengths of this paper are that the survey had a high response rate (> 90%), was carried out by an independent survey organization, and employed local community health workers for data collection.

Conclusion

The high mortality rate in Rehri Goth will serve as the baseline against which the impact of the integrated MNCH program will be evaluated.

Limitations

One of the limitations of census was recall bias. This might lead to under-estimation of the true mortality rate in the community. We were able to assess this by comparing census data with prospective surveillance data from the ANISA study, (19) which showed a mortality rate 15% higher than the census estimate. For purposes of evaluation, we will measure impact of our integrated MNCH package relative to the prospective surveillance mortality data.

Abbreviations

ANISA	Aetiology of Neonatal Infections in South Asia
MDGs	Millennium Development Goals
MNCH	Maternal, neonatal and child health

Declarations

Ethics approval and consent to participate

Approval was taken from community leaders and a locally representative non-governmental organization before starting the census and a verbal consent was taken from the head of each household before commencing the interview.

Consent for publication

Participants were informed during consent that de-identified aggregated results might be presented at different forums and published in scientific journals

Availability of data and materials

Data generated and analyzed during this census is available from the corresponding author on request.

Competing interests

None declared

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Authors' contributions

IN and MI led the design and implementation of the study. YS and BB helped in implementation. AKMZ provided technical oversight. IA and SM performed data analysis. MI and KN wrote the first draft. AM, RA, AKMZ and all other authors contributed to subsequent versions. All authors read and approved the final manuscript.

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Figures

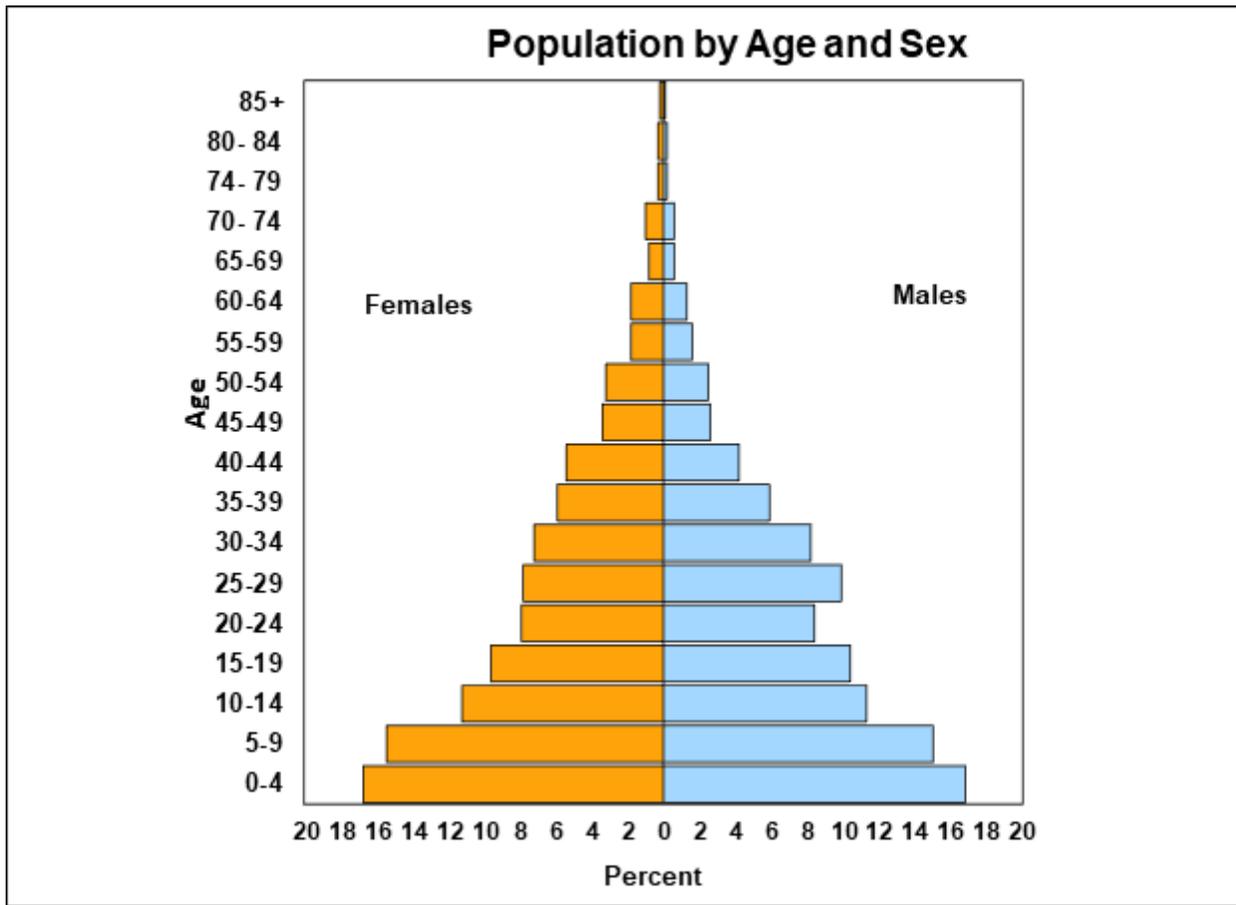


Figure 1

Population pyramid as per 2014 census

Supplementary Files

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