Risks for communication delays and disorders in infants in an urban primary healthcare clinic

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Background. Many risk factors may result in a communication delay. Reliable identification methods are essential to identify infants at risk of communication difficulties in the primary healthcare context. Literature on identifying both at-risk and established risk factors associated with communication disorders in South Africa is limited.
Objective. To identify and describe risk factors for communication delays in infants 0 - 12 months of age at Daspoort Polyclinic in Gauteng.
Methods. A structured interview schedule was utilised to conduct an interview with the caregiver participants. Convenience sampling was used to select 96 caregiver participants.
Results. The results obtained indicated that all infant participants presented with exposure to one or more risk factors that may possibly impact communication development. High frequencies of risk factors included colds and/or flu during pregnancy, previous miscarriages, maternal smoking, low educational levels and unemployment.
Conclusion. The high frequency of at-risk conditions within the Daspoort population justifies the importance of implementation of early communication intervention services in primary healthcare.

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Developmental disorders in infants and toddlers burden the family and society by causing illiteracy, unemployment and low income.[1] Communication delays and disorders can be prevented if risks are identified early.[2,3] Established risk factors include genetic, neurological and sensory disorders and severe toxic exposure that may result in conditions such as fetal alcohol spectrum disorder (FASD).[4,5] South Africa (SA) has a higher prevalence of FASD and HIV/AIDS than other countries in the world.[6,7]

The identification of established risk factors for communication delays at birth can ensure that at-risk infants are monitored and integrated into effective early communication intervention programmes.[8] However, infants with established risks within the primary healthcare (PHC) context of SA are not identified and referred for timeous assessment and early intervention.[3] In SA 85% of the population relies on public healthcare services, in which early communication intervention has not been effectively implemented nationally.[9] Identifying at-risk infants early is of importance within the PHC context, as the ultimate goal of early communication intervention is prevention of communication delays and disorders.[3]

Environmental risk factors may lead to developmental difficulties, such as communication delays or disorders, later in life.[1] Environmental factors include alcohol and drug abuse,[10] parental neglect and abuse and lack of parent-child interaction.[11] Parents with low education levels, poor mental or physical health and poor coping strategies contribute to the number of at-risk infants.[2] Therefore a lack of parental knowledge and stimulation due to poor knowledge may lead to communication delays and disorders in young children.[2]

Other factors that place young children at risk include adolescent mothers, single parents and low-income households.[12] In SA 29.8% of the population is unemployed, resulting in many children being raised in low-income households.[13] Poor living conditions hamper the quality and quantity of prenatal care, placing unborn infants at risk of both preterm birth and low birthweight, which are themselves risk factors for communication delay.[10]

The presence of multiple risk factors for communication delays in an infant population warrants the implementation of early identification services in underserved communities in SA. To reduce long-term financial burdens as a result of communication delays, which snowball into social and academic difficulties, at-risk infants must be identified quickly and receive early intervention services.[8] The use of a risk assessment is proposed, in addition to the use of a developmental screening tool, to facilitate early identification of at-risk infants in the PHC context. This will enable professionals from various specialties to identify risk factors associated with communication disorders.

Ideally all children at risk of experiencing possible communication difficulties should receive an intensive, high-quality early communication assessment and, if deemed necessary, early intervention within the first 3 years of life.[1] Being able to identify risk factors in a reliable and effective manner is one step closer to realising the ideal of implementing early communication intervention in the PHC system.

Objective

The objective of this study was to describe risk factors for communication delays or disorders in infants aged 0 - 12 months in an urban PHC clinic.

Methods

Setting and participants

Daspoort is a suburb situated in Pretoria-West, Gauteng Province, SA. The community consists of 6 355 individuals and 1 582 households. The three official SA languages predominantly spoken in the area are Afrikaans (83.19%), English (6.44%) and Sepedi (1.66%).[13]

All the caregivers of infants aged from birth to 12 months who visited Daspoort Polyclinic on Fridays during March and April 2014 were asked to participate in the study. A total of 96 participants with an equal sex distribution among the infants (54 males and 42 females) were included in the study. The mean age of the infant participants was 4.75 months (standard deviation 3.70) (Table 1).

Data collection

A risk assessment tool compiled as part of a master's study[14] and revised using literature was used to collect data. The tool consisted of five sections including general information, prenatal history, environmental risk factors, perinatal history and established risk conditions. Only risk factors for communication delays/disorders with supporting evidence were included in the tool.[1,8,10,11,15]

Data were collected through a structured face-to-face interview with each caregiver. The interview schedule was administered by two final-year Speech-Language Pathology and Audiology students registered with the Health Professions Council of South Africa. Referrals were made to allied healthcare professionals when infants presented with established risk conditions, or when three or more conditions putting them at risk were identified. Preventive strategies such as developmental screening and parent education on child development and appropriate stimulation of infants were provided upon return after referral. Comprehensive assessment was provided when deemed necessary by the allied healthcare professionals. Infants with one or two at-risk conditions were followed up during health-related or immunisation visits by means of informal general developmental surveillance in addition to the *Road to Health* booklet screening.

Data analysis

SPSS version 22 (IBM, USA) was used to analyse the data. Descriptive statistics were used to describe the results. Relationships between variables were determined with Pearson product moment correlations. Correlations between risk factors of 0.3 and ≤0.5 were classified as moderate, and correlations of ≥0.5 were deemed strong.

Ethics approval

Prior to data collection ethical clearance was obtained from the Research Committee of the Faculty of Humanities at the University of Pretoria. The researchers visited Daspoort Polyclinic one morning per week for 8 weeks. Caregivers were informed about what the study entailed and voluntary participation was requested. Verbal and written informed consent was obtained from the caregivers.

Results

Of the total population (n=96), 13 infants were exposed to ≥10 risk factors, while a further 35 infants had 6 - 9 risks. More than a third (37 infants) presented with 3 - 5 risk factors, whereas 11 infants only had 1 or 2 risks.

Prenatal risk factors

Eleven mothers were older than 35 years of age at the birth of their infants (Table 2). Many participants (n=42) reported previous miscarriages. A moderate inverse relationship was found between the mother's age and previous miscarriages (r=–0.306; p=0.002). The younger the mother, the more miscarriages were experienced.

Of the 32 mothers who indicated that they smoked during pregnancy, an average of 6.6 cigarettes was smoked daily. Also, 14 mothers consumed alcohol during their pregnancies. A moderate correlation between alcohol and drug usage and premature rupture of membranes during pregnancy was found (r=0.338; p=0.001). A family history of hearing loss was reported by 14 of the caregiver participants.

Half of the mothers presented with colds, flu or both during pregnancy. A total of 14 mothers were hospitalised during pregnancy as a result of vaginal bleeding, complications associated with a multiple pregnancy, pneumonia and asthma, round ligament disorder and thrombosis as well as placental, umbilical cord and uterine complications. Preterm birth was reported in 16 pregnancies.

Perinatal and established risk factors

The majority (77%) of the participants reported one or more perinatal risk factor (Table 3). Only two of the infants presented with craniofacial abnormalities: a cleft palate in one and deformational plagiocephaly in another.

Table 1. Characteristics of participants (n=96)

Characteristic	n (%)
Sex of baby	
Male	54 (56.3)
Female	42 (43.8)
Race of the baby	
Black	36 (37.5)
White	55 (57.3)
Asian	1 (1.0)
Coloured	4 (4.2)
Age of baby (months)	
0 - 4	58 (60.4)
5 - 8	13 (13.5)
9 - 12	25 (26.0)
Relationship to the baby	
Mother	89 (92.7)
Father	2 (2.1)
Grandmother	3 (3.1)
Aunt	1 (1.0)
Caregiver	1 (1.0)

Change of hospitals was reported by 14 participants; reasons included depleted medical aid, cleft palate, maternal high blood pressure, extreme vaginal bleeding and meconium aspiration. A change in hospitals was also associated with infants receiving phototherapy for hyperbilirubinaemia (r=0.452; p<0.001) or for those who had facial abnormalities (r=0.335; p=0.001). Phototherapy was provided to 7 of the infants, for an average of 39 hours, while 3 received exchange blood transfusions for treatment of hyperbilirubinaemia.

Low birthweight was described in 28 of the infants. After birth, 12 of the infants received oxygen for an average of 9 hours. Meningitis had been diagnosed in 3 infants. Other infections reported included laryngitis,

Table 2. Prenatal risk factors (N=96)

Risk factor	n (%)
Colds and/or flu during pregnancy	48 (50)
Previous miscarriages/stillbirths	42 (44)
Maternal smoking during pregnancy	32 (33)
Pregnancy duration (weeks)	
>42	17 (18)
32 - 37	15(16)
28 - 32	1 (1)
Maternal alcohol use during pregnancy	14 (15)
Family history of hearing loss	14 (15)
Hospitalisation during pregnancy	14 (15)
No pregnancy education	14 (15)
Mothers ≥35 years at infant's birth	11 (12)
Maternal diabetes	7 (7)
HIV/AIDS infection during pregnancy	7 (7)
Pre-eclampsia	7 (7)
Premature rupture of membranes	7 (7)
Threatened abortion	6 (6)
Multiple pregnancies (twins)	5 (5)
Mothers <18 years at infant's birth	4 (4)
Placental complications	3 (3)
Disorders in siblings	
Congenital disorders	3 (3)
Neurological disorders	2 (2)
Mental disability	1 (1)
Negative rhesus factor	2 (2)
<2 doctor/clinic visits during pregnancy	1 (1)
In vitro fertilisation	1 (1)
Home births	1 (1)

respiratory syncytial virus and otitis media. The majority of mothers (n=51) preferred breastfeeding, whereas a third (n=32) formula-fed their infants.

A strong association was found between instruments (e.g. forceps and vacuums) used during birth and meconium aspiration (r=0.520; p<0.001). Moderate correlations were found between meconium aspiration and change of hospitals (r=0.302; p=0.003), and meconium aspiration and Apgar score at 1 minute (r=0.308; p=0.002).

Table 3. Perinatal risk factors (N=96)

Risk factor	*n* (%)
Feeding method after birth	
Breastfeeding	51 (53)
Formula feeding	32 (33)
Bottle and breast	12 (13)
Nasogastric tube	1 (1)
Birthweight (1 500 - 2 500 g)	28 (29)
Caesarean section as birth method	24 (25)
Infant received antibiotics after birth	15 (16)
Change of hospitals after birth	14 (15)
Infant received oxygen after birth	12 (13)
Umbilical cord around infant's neck	12 (13)
Bronchopulmonary dysplasia in an infant	10 (10)
Incubator/warm table	10 (10)
Apnoea and bradycardia in infant	8 (8)
Birth position of infant (breech)	8 (8)
Phototherapy for hyperbilirubinaema	7 (7)
Instruments used during birth	6 (6)
Infant small for gestational age	6 (6)
Meconium aspiration	5 (5)
Neonatal intensive care unit admission	5 (5)
Respiratory distress syndrome	5 (5)
Apgar score <7 (1 min)	4 (4)
Patent ductus arteriosus	4 (4)
Apgar score <7 (5 min)	3 (3)
Blood transfusion(s)	3 (3)
Meningitis in infant	3 (3)
Other infections in infant	3 (3)
Necrotising enterocolitis	2 (2)
Infant placed on ventilation	2 (2)
Septicaemia in infant	2 (2)
Hydrocephalus in infant	1 (1)

Environmental risk factors

Most of the mothers (n=75) were unemployed and were the primary caregivers responsible for the daily care of the infant. Half (n=50) of the caregivers reported their highest level of education being Grade 10, while six had tertiary qualifications (Table 4).

The majority of participants (n=58) used public transport or reached the clinic as pedestrians. A third of the participants (n=31) lived in informal housing or with others and had three or more children.

Discussion

All participants presented with one or more risk factors, while 50% had six or more risks for communication delays or disorders. The higher the number of risk factors, the greater the impact on infant development.[16] The high prevalence of risks confirms the necessity of a reliable screening tool to identify possible communication problems timeously.

Half the participants reported that they had had colds and/or flu during their pregnancies. Pregnant women are at high risk of experiencing infections like influenza (flu).[17] This is of concern as infections can reach the fetus through the feto-placental barrier, which can affect the developing fetus' health later in life.[18] A mother's behaviour and general health during a pregnancy has a long-term impact on the health of a child.[19] Mothers should be encouraged to modify their own behaviour during pregnancy in order to ameliorate possible risks.

A disturbing finding was that one-third of the participants had smoked during pregnancy. Smoking during pregnancy is associated with attention-deficit hyperactivity disorder,[5] preterm birth, low birthweight and infant morbidity and mortality.[20] Also, 15% indicated alcohol consumption during pregnancy, which could have resulted in FASD. Alcohol exposure during pregnancy may have devastating effects on neurological development and can lead to difficulties in a many areas including language, memory, learning, attention, motor coordination, problem-solving skills and abstract thinking.[4,5] A moderate correlation was also found between alcohol and drug usage during pregnancy and premature rupture of membranes.

Table 4. Environmental risk factors (N=96)

Risk factor	*n* (%)
Unemployed mothers	75 (78)
Pedestrian or use of public transport	58 (60)
Highest qualification	
≤ Grade 10	50 (52)
Grade 11 or 12	40 (42)
≥3 other children	31 (32)
Poor/average general health of the mother	24 (25)
Employed mother	21 (22)
Financial support	
Grandparent/s	19 (20)
Government grant	8 (8)
Other family members	2 (2)

Creating awareness in mothers on the impact of their health, alcohol use and smoking on their unborn children may help to eliminate these risks. Preterm birth (16%) and low birthweight (29%) were prevalent amongst participants in this study. Infants who present with perinatal risk conditions have a tendency to present with a general developmental delay as well as delayed language and learning development.[21] Previous research revealed that preterm and low birthweight infants present with language delays by the age of 3 years.[21]

A disturbingly high percentage of young mothers who had had miscarriages (44%) was noted. Prior miscarriages are associated with preterm delivery and low birthweight.[22] Studies found that women who experienced a previous spontaneous abortion were 2.8 times more likely to have low birthweight babies and 1.7 times more likely to give birth preterm.[22] Thus the higher the number of previous miscarriages, the greater the risk of having a preterm, low-birthweight infant.[22]

Assisted vaginal delivery (AVD) is often associated with fetal distress or incorrect fetal head position, requiring the use of forceps or vacuum extraction.[23] Distressed fetuses may aspirate meconium, but possibly also vernix, blood and pus. Distressed fetuses are prone to aspiration, and AVD is often implemented when fetal distress occurs. This may explain the correlation between instrumentation use during birth and meconium aspiration.

Approximately one-third of the mothers were found to be using formula feeding after birth. The introduction of formula milk before the age of 6 months increases the risk of otitis media,[24] which may result in conductive hearing loss if left untreated. Conductive hearing loss causes infants to miss out on early language learning opportunities and may therefore negatively impact an infant's communication development.[14] In contrast, breastmilk provides the infant with antibodies to protect against infections, enhances the function of the intestinal barrier and also protects the infant from inflammation.

Low maternal education and higher birth order have been identified as risk factors predictive of potential communication disorders.[14] Half of the mothers received

schooling only up to Grade 10, this possibly contributing to the high unemployment rate (78%). Unemployment is associated with a lack of sufficient financial resources, requiring supplementary support such as income from grandparents (20%), government grants or other family members. Poverty as such is an indirect cause of communication difficulties, as poverty-associated conditions rather than poverty itself cause communication delays or disorders.[14] Living in poor socioeconomic circumstances with increased environmental stressors has an adverse impact on a child's development and specifically on language abilities.[14]

There was a moderate correlation between change of hospitals after birth and phototherapy for hyperbilirubinaemia. This raises concerns with regard to secondary healthcare/regional hospitals' ability to render these basic services, as a change in hospital is regarded as a risk in itself. In a developing SA the majority of patients rely on public healthcare services, which are often conservative.[9] Early intervention services in PHC are lacking as a result of limited human and financial resources as well as a lack of equipment, materials and an effective referral framework.[3]

These results confirmed a need for early communication intervention in an underserved community. The services required include a risk assessment, communication screening and developmental surveillance and, if deemed necessary, comprehensive assessment and early intervention. It is recommended that future research should compare the outcome of a risk assessment against the outcome of a diagnostic tool.

Study limitations

A possible limitation of the current study involved the use of a structured interview schedule, implying that the researchers had to rely on the caregivers' report. However, it is widely accepted that parents hold a key position in the early identification and diagnosis of communication disorders within their children.[8,14]

Conclusion

Within this population, where all infants are at risk, regular communication screening and developmental surveillance should occur in order to monitor development. However, all children experiencing a possibility of a communication delay or disorder should receive early communication intervention within the first 3 years of life.[1] The high frequency of at-risk conditions within the Daspoort population justifies the need to implement early communication intervention services in PHC.

Finally, preventive strategies such as parental training, communication screening, general developmental surveillance and a risk assessment should be implemented in underserved communities in SA, to support families burdened by communication delays or disorders.

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