Pediatric Health, Medicine and Therapeutics

Dovepress
open access to scientific and medical research

Open Access Full Text Article

REVIEW

Sudden infant death syndrome: an unrecognized killer in developing countries

This article was published in the following Dove Press journal:
Pediatric Health, Medicine and Therapeutics
3 February 2016
Number of times this article has been viewed

Ikenna Kingsley Ndu

Department of Paediatrics, Enugu State University Teaching Hospital, Enugu, Nigeria

Abstract: Sudden infant death syndrome (SIDS) is defined as the sudden unexpected death of an infant <1 year of age, with onset of the fatal episode apparently occurring during sleep, that remains unexplained after a thorough investigation including performance of a complete autopsy and review of the circumstances of death and the clinical history. SIDS contributes to infant mortality and resulted in ~15,000 deaths globally in 2013. Most of the risk factors of SIDS are common in developing countries; yet, there has been little interest in SIDS by researchers in Africa. This review looks at the extent of the attention given to SIDS in a developing country like Nigeria, and factors responsible for the scarce data concerning this significant cause of mortality.

Keywords: SIDS, mortality, Nigeria

Video abstract

Point your SmartPhone at the code above. If you have a QR code reader the video abstract will appear. Or use: http://youtu.be/K85yujBEvHQ

Introduction

Sudden infant death syndrome (SIDS) is defined as the sudden unexpected death of an infant <1 year of age with onset of the fatal episode apparently occurring during sleep, that remains unexplained after a thorough investigation, including performance of a complete autopsy and review of the circumstances of death and the clinical history.[1] It is an important cause of infant mortality which in 2013 accounted for 15,000 infant deaths worldwide.[2] SIDS is a subset of sudden unexpected death in infancy (SUDI) which describes all sudden unexpected infant deaths regardless of cause.[3] Other causes of SUDI include illnesses that are explained by findings from the autopsy and scene investigation, such as infection, infanticide, inherited disorders of fatty acid metabolism, suffocation in bed, and cardiac channel defects.[3] Thus, it is more accurate to use SUDI as an emergency room diagnosis because to confirm the diagnosis of SIDS, a complete forensic autopsy needs to be performed, using information gathered from the scene investigation, interview of caregivers, and review of medical and social history.[3,4] However, the distinction between the two is difficult, and the use of the term SIDS remains vital because it captures all of the inherent elements currently believed to be critical to the mechanisms involved in the death of these infants.[5,6] These cases are not identified using positive criteria, such as an agreed pattern of symptoms, signs, or explanatory pathology, but by the absence of evidence for an alternative cause of death.[7]

Most of the risk factors of SIDS are common in developing countries, and post-neonatal mortality rates (a subset of infant mortality rate) remaining high in these countries has a proven association with SIDS.[3] Yet, there has been little interest in SIDS by researchers in Africa.[8] This review is to look at the extent of attention given

Correspondence: Ikenna Kingsley Ndu
Department of Paediatrics, Enugu State University Teaching Hospital, PMB 1030, Parklane, Enugu, Nigeria
Tel +234 80 6056 8724
Email ikennandu@gmail.com

submit your manuscript | www.dovepress.com
Dovepress
http://dx.doi.org/10.2147/PHMT.S99685

to SIDS in a developing country like Nigeria and factors responsible for scarce data concerning this significant cause of mortality.

Literature search strategy

Literature search was conducted through PubMed and Google web search for articles on SIDS. The following search terms were employed: "sudden infant death syndrome definition", "sudden infant death syndrome", "sudden infant death syndrome Nigeria", and "sudden infant death syndrome diagnosis". Studies relevant to the objectives of the review were subsequently selected and reviewed.

Epidemiology

Globally, SIDS resulted in ~15,000 deaths in 2013 down from 22,000 deaths in 1990.[2] In the USA, SIDS is the third leading cause of infant death, and took the lives of ~1,500 children in 2013.[9,10] This represents a dramatic reduction after the identification of the prone sleeping position as a major modifiable risk factor led to the introduction of the "Back to sleep" or "Reduce the risk" campaigns in 1994.[11–13] After the introduction of the "Back to sleep" campaign in 1994, SIDS rates declined by >50%, from 130.3 deaths per 100,000 live births in 1990 to 39.7 deaths per 100,000 live births in 2013 in the USA.[10,11] International trends across 15 countries also revealed a similar decline after the introduction of risk reduction and safe sleep campaigns.[3] For most of these countries, there was a large decrease in SIDS rates, from 40% in Argentina to 86% in France between 1990 and 2008.[3] The decline in SIDS rates was associated with a reduction of total postneonatal mortality rates, and thus, the decline in SIDS was real rather than the result of classifying SIDS as other causes of death.[3,14]

Death from SIDS can occur anytime during a baby's first year, and the peak incidence is between 2 and 4 months of age, but the majority (90%) of SIDS deaths occur before a baby reaches 6 months of age.[9,15] It occurs more often in males than females.[14,16]

Several other risk factors have been identified, many of which are modifiable or avoidable, but some cannot be modified or are unavoidable.[6,17] Unavoidable risk factors include a preceding infectious illness, low socioeconomic class, low birth weight, preterm birth, ethnicity, and high parity.[6,14] After the identification of the prone sleeping position as a major modifiable risk factor in the late 1980s with increased risk of SIDS, the single most effective action that parents and caregivers can take to lower SIDS risk is to place their baby to sleep on his or her back at all sleep times.[12,17] Other modifiable risk factors include side sleeping position, maternal smoking during pregnancy, parental smoking after delivery, excess thermal insulation, and bed sharing.[6,14,18] Protective factors have also been identified; these include breastfeeding, immunization, room sharing, and pacifier use.[14]

A number of hypotheses have been proposed over the years to explain SIDS, including several triple-risk hypotheses.[19–26] However, the recent discovery of morphological differences in the brainstem of infants who have died from SIDS indicates that such cases may represent immature development of centers responsible for arousal, cardiovascular, and respiratory functions.[27,28]

SIDS in Nigeria

The poor socioeconomic conditions and ignorance that provide the background for SIDS are common in Nigeria as with other developing countries, and yet, there is shortage of data from our national statistical records. The two Nigerian studies found in the literature were limited to infant sleeping positions and confirm predominance of prone/side sleeping positions.[8,29]

As a diagnosis of exclusion, SIDS is a source of concern, particularly in developing countries without the prerequisite diagnostic facilities including toxicology and microbiological investigations. In addition, autopsy rates are generally low in developing countries like Nigeria due to factors ranging from sociocultural and religious to administrative and ethnic.[30,31]

Ugiagbe and Osifo[32] in a retrospective study in Benin noted the cultural belief that dead neonates were taboo and considered a punishment for past offences. Oluwasola et al[31] in a survey of factors influencing acceptance of autopsy at Ibadan noted that Christians were found to be about six times more likely to consent to autopsy than Muslims. These factors influence parents/caregivers to refuse postmortem analysis.

There is also the fact that most of the SIDS deaths may not present to the hospital because of prevailing cultural beliefs in traditional communities. The phenomenon of recurrent reincarnation called "Ogbanje"[33] in South East Nigeria has been linked with sickle cell anemia, a condition which is considered "paranormal".[34] An unexplained death from SIDS may also be linked to the "Ogbanje" phenomenon. In addition, other cultural beliefs like the suspicion of witch craft may provide explanations to grieving parents for SIDS and lead to fatalistic acceptance of death, thus foreclosing presentation to hospital and the need for further medical investigations. These deaths go undocumented and may contribute to underreporting of SIDS. The ability to make

the diagnosis of SIDS will minimize accusations of witch craft or foul play, a common practice in our environment, and also reduce the burden of guilt on parents.

Under the Coroners Act in Nigeria, reports about such deaths should originate through reports by complaints to the police and reports by health practitioners to the coroner or the police for death scene investigations by the pathologist.[35,36] However, due to inadequate funding and poor coordination between emergency medical services, law enforcement agencies, emergency department personnel, and social/child protective services, most cases of SIDS in our environment are rushed first to hospital and thereafter labeled as "dead on arrival". Thus, the opportunity to carry out the death scene investigation, which is an integral part of SIDS diagnosis, is missed. Consequently, the diagnosis of SIDS is lacking from most studies on mortality patterns in Nigerian children emergency rooms. Their statistics are not available for scientific analysis, and this is a major loss of data due to lack of enforcement of standard protocols for such deaths.

Despite these limitations to diagnosing SIDS, Geib and Nunes[37] have demonstrated that sudden infant death can be studied in developing countries. There are also suggestions that the diagnosis can be made even in the absence of an autopsy.[38,39] With this in mind, medical practitioners with a high index of suspicion may make this diagnosis more often. It is the physician's responsibility to report a suspected case to the police, and this is the crucial first step in getting an accurate diagnosis of SIDS.[39]

In the developing world where resources are severely limited, autopsies and death scene investigations are not routinely done, and other causes of infant mortality predominate, such as infectious diseases.[40] It thus becomes difficult to determine objectively autopsy rates for infants and the rates of other causes of SUDI like suffocation. This dearth of information from autopsies and death scene investigations has prevented the initiation of educational and preventive measures and the identification of more vulnerable groups.[37]

The 2014 World Bank estimate of infant mortality rate in Nigeria was 72 per 1,000 live births[41] which is unacceptably high and has a proven association with SIDS.[3] Yet, there is no SIDS case registry in Nigeria, thus making it difficult to improve reporting through surveillance and monitoring. The absence of risk reduction campaigns can also be linked directly to the dearth of data on SIDS.

An increase in awareness among the local population and health personnel through more research and health education campaigns will help reduce mortality from SIDS. The effect of preventive measures and simple behavioral modification strategies can also be objectively monitored against baseline data.

Conclusion

It is safe to conclude that there is under-reporting and a dearth of literature on SIDS in Nigeria. The introduction of risk reduction campaigns which have been clearly linked with reduction of SIDS rates in developed countries will improve surveillance and monitoring in Nigeria. It is hoped that this brief review will stimulate more interest in this significant cause of infant mortality.

Acknowledgment

The author acknowledges the support of Dr SN Uwaezuoke to commence advocacy for SIDS recognition in Nigeria.

Disclosure

The author reports no conflicts of interest in this work.

References

1. Krous HF, Beckwith JB, Byard RW, et al. Sudden infant death syndrome (SIDS) and unclassified sudden infant deaths (USID): a definitional and diagnostic approach. *Pediatrics*. 2004;114:234–238.
2. Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. GBD 2013 Mortality and Causes of Death Collaborators. *Lancet*. 2015;385(9963):117–171.
3. Hauck RF, Tanabe KO. International trends in sudden infant death syndrome and other sudden unexpected deaths in infancy: need for better diagnostic standardization. *Curr Pediatr Rev*. 2010;95(101):1–24.
4. Hymel KP. Distinguishing sudden infant death syndrome from child abuse fatalities. *Pediatrics*. 2006;118(1):421–427.
5. Krous HF. A commentary on changing infant death rates and a plea to use sudden infant death syndrome as a cause of death. *Forensic Sci Med Pathol*. 2013;9:91–93.
6. Blaset SG, Wegmann U. Differences in the prevalence of risk and protective factors for SIDS between Germany and the Netherlands. The Netherlands: University of Twente. Available from: http://essay.utwente.nl/61975/1/Bachelorverslag_S_G_Blaset_en_U_Wegmann_%28eindversie%29.pdf. Accessed September 24, 2015.
7. Ferguson AH. Ignored disease or diagnostic dustbin? Sudden infant death syndrome in the British context. *Soc Hist Med*. 2015;28(3):487–508.
8. Ibeziako NS, Ibekwe RC, Ibe BC. Infant sleeping environment in south-eastern Nigeria (sleeping place and sleeping position): a preliminary survey. *J Trop Med*. 2009:283046.
9. Centers for Disease Control and Prevention [homepage on the Internet]. Sudden infant death syndrome (SIDS) [updated October 5, 2015]. Available from: http://www.cdc.gov/features/sidsawarenessmonth/. Accessed October 25, 2015.
10. Centers for Disease Control and Prevention [homepage on the Internet]. Sudden unexpected infant death and sudden infant death syndrome [updated October 22, 2015]. Available from: http://www.cdc.gov/sids/data.htm. Accessed October 25, 2015.
11. Mitchell EA, Taylor BJ, Ford RPK, et al. Four modifiable and other major risk factors for cot death: the New Zealand Study. *J Paediatr Child Health*. 1992;28(Suppl 1):S3–S8.
12. Dwyer T, Ponsonby AL. Decline of SIDS: a success story for epidemiology. *Epidemiology*. 1996;7:323–325.

13. Mitchell EA, Brunt JM, Everard C. Reduction in mortality from sudden infant death syndrome in New Zealand: 1986–1992. *Arch Dis Child*. 1994;70:291–294.
14. Mitchell EA, Krous HF. Sudden unexpected death in infancy: a historical perspective. *J Paediatr Child Health*. 2015;51(1):108–112.
15. Trachtenberg FL, Haas EA, Kinney HC, Stanley C, Krous HF. Risk factor changes for sudden infant death syndrome after initiation of Back-to-Sleep campaign. *Pediatrics*. 2012;129(4):630–638.
16. Heron M. Deaths: leading causes for 2008. National Vital Statistics Reports [serial on the Internet]. 2012;60(6). Available from: http://www.cdc.gov/nchs/data/nvsr/nvsr60/nvsr60_06.pdf. Accessed June 15, 2012.
17. National Institute of Child Health and Human Development [homepage on the Internet]. How many infants die from SIDS or are at risk for SIDS?; 2013. Available from: https://www.nichd.nih.gov/health/topics/sids/conditioninfo/Pages/risk.aspx. Accessed September 24, 2015.
18. Kinney HC, Thach BT. The sudden infant death syndrome. *N Engl J Med*. 2009;361:795–805.
19. Steinschneider A. Prolonged apnea and the sudden infant death syndrome: clinical and laboratory observations. *Pediatrics*. 1972;50:646–654.
20. American Academy of Pediatrics, Task Force on Prolonged Infantile Apnea. Prolonged infantile apnea: 1985. *Pediatrics*. 1985;76:129–131.
21. Committee on Fetus and Newborn. American Academy of Pediatrics. Apnea, sudden infant death syndrome, and home monitoring. *Pediatrics*. 2003;111(4):914–917.
22. Bergman AB. Synthesis. In: Bergman AB, Beckwith JB, Ray CG, editors. *Sudden Infant Death Syndrome*. Seattle, WA: University of Washington Press; 1970:210–211.
23. Wedgwood RJ. Session 1. Sudden and unexpected deaths in infancy (cot deaths). In: Camps FE, Carpenter RG, editors. *Sudden and Unexpected Death in Infancy (Cot Deaths)*. Bristol, England: Wright; 1972:22–28.
24. Rognum TO, Saugstad OD. Biochemical and immunological studies in SIDS victims. Clues to understanding the death mechanism. *Acta Paediatr*. 1993;82(Suppl 390):S82–S85.
25. Filiano JJ, Kinney HC. A perspective on neuropathologic findings in victims of the sudden infant death syndrome: the triple-risk model. *Biol Neonate*. 1994;65:194–197.
26. Guntheroth WG, Spiers PS. The triple risk hypotheses in sudden infant death syndrome. *Pediatrics*. 2002;110(5):e64.
27. Audero E, Gross C. Could serotonin play a role in sudden infant death? *Pediatr Res*. 2009;65(2):131.
28. Paterson DS, Trachtenberg FL, Thompson EG, et al. Multiple serotonergic brainstem abnormalities in sudden infant death syndrome. *JAMA*. 2006;296(17):2124–2132.
29. Okpere AN, Opara PI. Mothers' knowledge and practice of infant sleep position. *Niger J Paediatr*. 2014;41(4):312–315.
30. Dan EM, Kunle AE, Nneka UI, Abraham OI. An audit of medical autopsy: experience at the University of Uyo Teaching Hospital (UUTH), Niger Delta Region, Nigeria. *Indian J Med Sci*. 2011;65:502–509.
31. Oluwasola OA, Fawole OI, Otegbayo AJ, Ogun GO, Adebamowo CA, Bamigboye AE. The autopsy: knowledge, attitude, and perceptions of doctors and relatives of the deceased. *Arch Pathol Lab Med*. 2009;133:78–82.
32. Ugiagbe EE, Osifo OD. Postmortem examinations on deceased neonates: a rarely utilized procedure in an African referral center. *Pediatr Dev Pathol*. 2012;15(1):1–4.
33. Nzewi E. Malevolent ogbanje: recurrent reincarnation or sickle cell disease? *Soc Sci Med*. 2001;52(9):1403–1416.
34. Ameh SJ, Tarfa FD, Ebeshi BU. Traditional herbal management of sickle cell anemia: lessons from Nigeria. *Anemia*. 2012. doi:10.1155/2012/607436.
35. Coroners Act of 1958, laws of the Federation of Nigeria and Lagos, Cap 41.
36. Oberaifo AW, Nwafor CC. Coroner autopsies originating from complaints to the police in a Nigerian Urban centre. *Kasr Al Ainy Med J*. 2015;21:11–15.
37. Geib LT, Nunes ML. The incidence of sudden death syndrome in a cohort of infants. *J Pediatr (Rio J)*. 2006;82(1):21–26.
38. Bergman AB. Studying sudden infant death syndrome in a developing country. *J Pediatr (Rio J)*. 2006;82(1):4–5.
39. Takatsu A, Misawa S, Yoshioka N, et al. A proposal of essentials for forensic pathological diagnosis of sudden infant death syndrome (SIDS). *Jpn J Legal Med*. 2000;54(2):247–255.
40. Ekanem EE, Asindi AA, Okoi OU. Community-based surveillance of paediatric deaths in Cross River State, Nigeria. *Trop Geogr Med*. 1994;46(5):305–308.
41. The World Bank [homepage on the Internet]. Mortality rate, infant (per 1,000 live births). Available from: http://data.worldbank.org/indicator/SP.DYN.IMRT.IN. Accessed October 3, 2015.