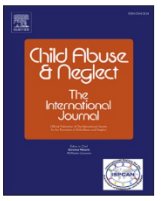
Child Abuse & Neglect 113 (2021) 104931

Contents lists available at ScienceDirect

Child Abuse & Neglect

journal homepage: www.elsevier.com/locate/chiabuneg



Patterns of child protection service involvement by Aboriginal children associated with a higher risk of self-harm in adolescence: A retrospective population cohort study using linked administrative data

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ARTICLE INFO

Keywords:
Child Protective services
Adolescent Self-harm
Aboriginal and Torres Strait Islander people

ABSTRACT

Background: A history of child maltreatment is known to elevate the risk of self-harm in adolescence. However, this link has not been investigated for Aboriginal children who experience a greater burden of both.
Objective: Identify patterns of involvement with child protection services by Aboriginal children associated with a higher risk of self-harm in adolescence.
Participants and setting: A cohort study was established using linked administrative records of Aboriginal children born in the Northern Territory (NT) of Australia.
Methods: Survival analysis techniques were used to determine the risk of self-harm in adolescence associated with different levels and timing of child protection involvement throughout childhood.
Result: The relative risk of self-harm was greatest for children with substantiated maltreatment in both early and middle childhood had nine times higher risk for self-harm (aHR: 9.11, 95% CI: 3.39-24.46,$p < 0.001$) and six times higher for children who experienced notifications in early childhood and substantiated maltreatment in middle childhood (aHR: 6.72, 95% CI:2.16-20.90, $p < 0.001$). Other patterns of child protection involvement observed in middle childhood alone also conferred a higher relative risk of self-harm in adolescence.
Conclusion: This study confirms a higher risk of self-harm in adolescence is associated with child maltreatment, especially in middle childhood. Addressing the intergenerational trauma in Aboriginal families is crucial to preventing child maltreatment and informing reforms to child protection responses that can better identify and address the culturally-specific unmet needs of Aboriginal families. This would go some way to fostering the healthy growth and development of Aboriginal children and reduce self-harm risk.

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https://doi.org/10.1016/j.chiabu.2021.104931
Received 18 August 2020; Received in revised form 4 November 2020; Accepted 3 January 2021
Available online 15 January 2021

1. Background

The evidence linking prior child maltreatment to subsequent suicide-related behaviours is well established. Across clinical and community studies and after accounting for other known risk factors, exposure to any type of maltreatment in childhood has consistently been identified with a higher risk of suicide-related behaviours (Miller, Esposito-Smythers, Weismoore, & Renshaw, 2013), defined here as intentional self-harm (irrespective of suicidality) and suicidal thoughts or ideation. Moreover, these adverse effects of childhood maltreatment persist well into later life, with the risk of suicide-related behaviours estimated to be two to three times higher amongst adults with a history of child maltreatment compared to those without (Angelakis, Gillespie, & Panagioti, 2019). When compared to other adverse childhood experiences, child maltreatment has been found to be the strongest risk factor for both the onset and persistence of suicide-related behaviours (Bruffaerts et al., 2010). Given that child maltreatment accounts for almost a third of the population burden of self-harm (Moore et al., 2015), a public health approach to the prevention of suicide-related behaviours in adolescence should give priority to targeting child maltreatment.

Importantly, longitudinal studies have uncovered patterns of child maltreatment that better distinguish levels of risk and clarify developmentally critical opportunities for preventive intervention. Types of maltreatment have been the primary focus of most studies, with physical abuse and sexual abuse typically conferring the greatest risk for subsequent suicide-related behaviours (Miller et al., 2013; Zatti et al., 2017). Whilst studies have established an increased risk of self-harm associated with higher lifetime frequency of maltreatment (Dube et al., 2001), more recent research has investigated the importance of the developmental timing of maltreatment but there is no consensus on specific critical periods of risk (Dunn, McLaughlin, Slopen, Rosand, & Smoller, 2013; Gomez et al., 2017; Hu, Taylor, Li, & Glauert, 2017). Further implications for prevention are emerging from studies identifying modifiable risk and protective factors that mediate and moderate, respectively, the relationship between maltreatment experiences and subsequent suicide-related behaviours (Abdelraheem, McAloon, & Shand, 2019; Paul & Ortin, 2019).

In Australia, Aboriginal and Torres Strait Islander (respectfully referred to hereafter as Aboriginal) children are a particularly vulnerable population group who, compared to the general population, experience six times the rate of child maltreatment as measured by reports of abuse to child protection services that are substantiated (Australian Institute of health & Welfare (AIHW), 2020) and twice the rate of self-harm as measured by hospital admissions (Harrison & Henley, 2014). It is widely recognised that both child maltreatment and self-harm are recent phenomena relatively unknown amongst Aboriginal people before the 1970s (Hunter, 1993). They are considered to be contemporary effects of intergenerational trauma and social disadvantage resulting from marginalisation and exclusion caused by European colonisation, especially due to the genocidal policies of forced child removals from Aboriginal families that have come to define the 'Stolen Generations' (McPhillips, Salter, Roberts-Pedersen, & Kezelman, 2020). From an Aboriginal perspective, the prevention of suicide-related behaviours must take a systemic approach to restoring the protective influence of families and kinship networks (Calma, Dudgeon, & Bray, 2017). Whilst self-reported exposure to family violence and conflict has been found to be associated with self-harm (Leckning et al., 2020) and suicide (Parker & Ben-Tovim, 2002) by Aboriginal people, there is very little evidence that clarifies the mechanisms by which child maltreatment leads to self-harm and, therefore, what the targets and opportunities for prevention may be.

Child protection services in Australia provide statutory responses to reports of alleged child maltreatment in the community (hereafter referred to as notifications) to ensure children are safe from harm. Determining whether these notifications are investigated and substantiated, wherein decisions are made about whether children need to be removed and placed in out-of-home care (OOHC), is one of the primary responsibilities of child protection services in Australia. A recent public inquiry into the protection and detention of children in the NT has recommended the child protection system be reformed to expand its focus beyond these statutory forensic responses to one that takes a more equitable and culturally responsive public health approach that can better address both the short-term welfare and longer-term outcomes of Aboriginal children who come to their attention (Royal Commission into the Protection & Detention of Children in the Northern Territory, 2017). However, there is little evidence that confirms and clarifies the opportunity for prevention presented by child protection involvement within an Aboriginal population. Unfortunately the one relevant Australian study investigating the relationship between child protection involvements and self-harm in Australia has not distinguished between Aboriginal and non-Aboriginal children (Hu et al., 2017).

These considerations are especially important in the Northern Territory (NT) of Australia, where 30% of residents identify as Aboriginal (Australian Bureau of Statistics (ABS), 2018). The consistently elevated and increasing rates of self-harm and suicide amongst young people in the NT (Leckning et al., 2016) prompted the NT Parliamentary inquiry in 2012 into the "youth suicide crisis" in which family contexts of risk and adversity were identified as an important but neglected area of early intervention prevention (Select Committee on Youth Suicide in the Northern Territory, 2015). To address the gaps in the evidence relevant to Aboriginal families and children that can inform reforms to the child protection system, a whole-population cohort study was designed to identify patterns of child protection service involvement associated with a higher risk of self-harm. The aim of this study is to investigate the association between the timing and levels of involvement with the child protection service in childhood and subsequent self-harm in adolescence that will help clarify opportunities for preventive intervention.

2. Methods

This retrospective cohort study makes use of a repository of linked de-identified unit-record administrative data on approximately 145,000 N T children born between 1994 and 2014 that is used to support the [NAME OF PROGRAM OF RESEARCH OMITTED FOR DOUBLE-BLIND REVIEWING]. The linkage was undertaken by SA NT DataLink using probabilistic methods to identify and match individual children to their records across all datasets followed by clerical review to resolve uncertain matches. This process is

confirmed to result in 99.6% accuracy for completed links (SA NT DataLink, 2020). Details of the data available in the repository are reported elsewhere (Leckning, Robinson, Guthridge, & He, 2019).

2.1. Study population

The study population comprises all Aboriginal children born in the NT between 1 January 1999 and 31 December 2003, inclusive, with at least one record in any of the linked datasets comprising the [NAME OF PROGRAM OF RESEARCH OMITTED FOR DOUBLE-BLIND REVIEWING] repository. Individuals were identified through birth records in the NT Perinatal Register, a statutory collection of information recorded for all births in the NT. Aboriginal children were identified by an algorithm that ranks the quality of identification recorded across all the datasets in the repository and selects Aboriginal status from the highest ranked dataset in which each child appears. After excluding the 145 children born to interstate mother and 20 children with missing perinatal information, our study population consisted of 6,467 Aboriginal children with no missing data.

2.2. Data sources

All Aboriginal children in the study population (n = 6,467) were linked to records in: the NT Child Protection collection, containing records of maltreatment reports, outcomes of investigations, care and protection orders, and episodes of out-of-home care (OOHC); the NT Inpatient Activity collection, containing records for admissions to all public hospitals in the NT between 1 July 2000 and 31 December 2017; the NT Student Activity collection, recording student enrolments and attendance at all NT government schools between 1 January 2005 and 31 December 2016; and, the NT NAPLAN collection containing results of standardised numeracy and literacy tests administered annually to all NT students in years 3, 5, 7 and 9 of schooling between 2008 and 2016, inclusive.

2.3. Measures

2.3.1. Self-harm

An outcome event was recorded where a hospital inpatient record existed for a child with any diagnosis code involving self-harm (ICD-10 codes X60 to X84) between 12 and 18 years of age (i.e. adolescence, for the purpose of this study).

2.3.2. Level and timing of child protection involvement

Since 1983, a policy of mandatory reporting has been in place in the NT which requires all adults by law to report to the child protection authority any children under the age of 18 years that they believe has or is suffering maltreatment or is at substantial risk of maltreatment, whether that be in the form of abuse or neglect. When these reports are made to the child protection authority, a notification record is created with details of the alleged maltreatment, socio-demographic details of the child, the result of a screening process to determine whether the report will be investigated and, the outcome of any investigation – that is, whether or not the report was substantiated. The records of these involvements with the child protection service are held in the NT Child Protection Notifications dataset.

All children in the study population were linked to their records from 1999 to 2017, if any, in the NT Child Protection Notifications dataset and two exposure status variables were created for analysis. The first variable contains mutually exclusive categories of the level of involvement with the child protection service: children with no notification records before 12 years of age (no involvement), children with unsubstantiated notification records only before 12 years of age (notifications only), children with records of substantiated maltreatment and no record of OOHC before 12 years of age (substantiations only), and children with records of substantiated maltreatment who were placed in OOHC. The second derived variable captures level of child protection service involvement across critical periods of childhood and is represented by 9 mutually exclusive categories. Given the small number, children with records of OOHC before 12 years of age were collapsed into the category of children with substantiated reports only (substantiation). This interaction of period and level of involvement with the child protection service is represented below in Table 1.

2.3.3. Confounding

Socio-demographic and perinatal risk factors. Adolescent self-harm and child maltreatment are known to share several risk factors. Perinatal risk factors were included that indicate developmental vulnerabilities in early life and the transmission of complex intergenerational trauma (Gibberd et al., 2019) known to be associated with a higher risk of maltreatment (Bugental & Happaney, 2004; Zhou, Hallisey, & Freymann, 2006) and self-harm in later life (Orri et al., 2019; Young, Riordan, & Stark, 2011). The perinatal characteristics that were deemed reliable and valid for inclusion in the analysis were: gestational age; birthweight; mother less than 20

Table 1
Categories of child protection service involvement by period of childhood and level of response.

		Middle childhood (5 to 11 years of age)		
		No involvement (*)	Notification only (N)	Substantiation (S)
Early childhood (0 to 4 years of age)	**No involvement (*)**	**	*N	*S
	Notification only (N)	N*	NN	NS
	Substantiation (S)	S*	SN	SS

years of age at birth; and parity. Sex and place of residence at the start of adolescence (i.e. during year 7 of school, obtained from a combination of school enrolment and NAPLAN records) were also included to adjust for any socio-demographic differences in both the exposure and outcome.

2.4. Statistical analyses

Survival analysis techniques were used to investigate the association between level and timing of involvement with the child protection service in childhood and first hospital admission involving self-harm in adolescence. The time scale used in these analyses was age in years and individuals were followed up from their 12th birthday until an outcome was observed, date of death (n = 12), the date of their 18th birthday, or 31 December 2017, whichever occurred first. The Kaplan-Meier estimator was used to calculate the cumulative probability of first hospital admission involving self-harm over time according to level of involvement with the child protection service. Cox proportional hazards regression was used to estimate the relative risk of first hospital admission involving self-harm in adolescence by level and timing of involvement with the child protection service in childhood whilst adjusting for confounding influences. Separate baseline hazard rates were estimated for each birth cohort in the Cox regression model to adjust for any cohort effects. The proportionality assumption of the Cox regression model was tested formally and visually using Schoenfeld residuals. The Royston R^2 statistic was used to measure the contribution of the exposure and confounding variables to explaining variations in first hospital admission involving self-harm in adolescence. All statistical analyses were conducted using Stata for Windows, Version 15 (StataCorp, 2017).

Table 2
Distribution of self-harm in adolescence by socio-demographic, perinatal and child protection characteristics of all Aboriginal children born between 1 January 1994 and 31 December 2004.

	Self-harm in adolescence		
	Yes %	**No** %	**Total** n
Level of child protection involvement before age 12			
No involvement	28.0	52.4	3,382
Notification only	34.0	25.2	1,634
Substantiation only	24.0	14.7	956
Out-of-home care	14.0	7.7	504
Timing of child protection involvement before age 12			
Notification in early childhood only	4.0	6.4	412
Notification in middle childhood only	40.0	28.3	1,836
Notification in both early and middle childhood	28.0	12.9	846
Level and timing of child protection involvement before age 12			
Notification in early childhood only	2.0	3.4	219
Substantiation in early childhood only	2.0	3.0	193
Notification in middle childhood only	26.0	18.6	1,209
Substantiation in middle childhood only	14.0	9.6	627
Notification in both early and middle childhood	6.0	3.9	255
Substantiation in early childhood and notification in middle childhood	2.0	2.9	185
Notification in early childhood and substantiation in middle childhood	8.0	3.0	194
Substantiation in both early and middle childhood	12.0	3.2	212
Sex			
Female	70.0	48.2	3,133
Male	30.0	51.8	3,343
Gestational age at birth			
Preterm (< 37 weeks)	22.0	13.3	866
Normal term (> = 37 weeks and < 42 weeks)	74.0	85.2	5,512
Post-term (> = 42 weeks)	4.0	1.5	98
Mother aged under 20 at birth			
No	78.0	69.2	4,488
Yes	22.0	30.8	1,988
Maternal parity			
0	28.0	33.4	2,162
1	34.0	24.4	1,588
>= 2	38.0	42.1	2,726
Residence (at Year 7)			
Darwin Urban	18.0	16.6	1,074
Darwin Rural	6.0	16.4	1,058
Katherine	16.0	16.3	1,055
East Arnhem	2.0	13.1	843
Barkly	6.0	5.3	341
Alice Urban	18.0	7.9	518
Alice Rural	8.0	7.5	487
Not found in school data	26.0	16.9	1,100

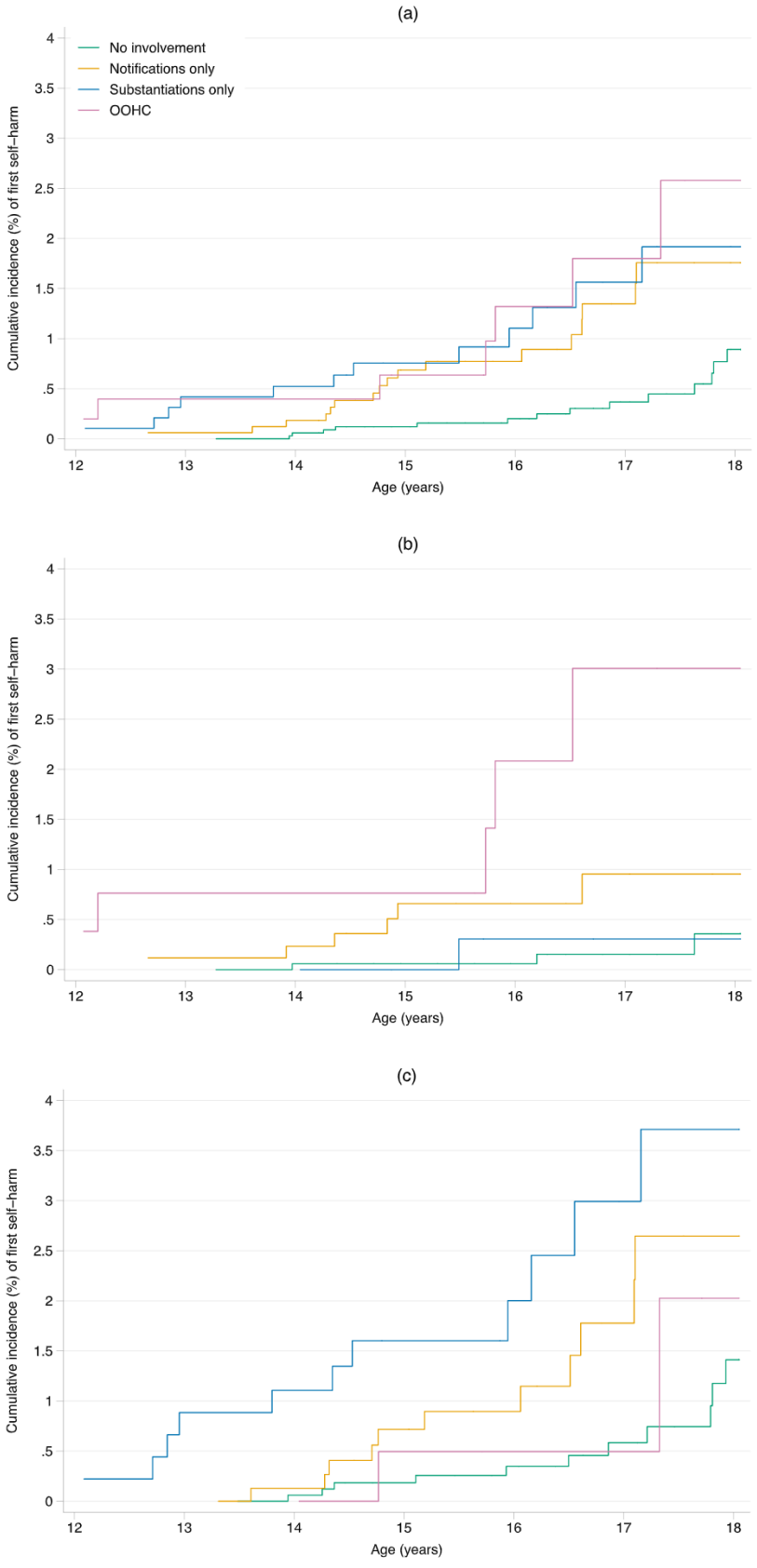

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Fig. 1. Cumulative incidence (%) of self-harm hospital admission by level of child protection involvement before age 12 for (a) all Aboriginal children, (b) Aboriginal boys, and (c) Aboriginal girls.

3. Results

3.1. Characteristics of study population

Of the 6,476 children in the study population, 3,094 (47.8%) were involved with the child protection service before their 12th birthday. Fifty children were observed with a hospital admission involving self-harm before their 18th birthday with 72% (n = 36/50) having a record of involvement with the child protection service before their 12th birthday. The characteristics of the study population according to their outcome status is summarised in Table 2.

3.2. Cumulative risk of self-harm hospital admission in adolescence

The cumulative risk of a hospital admission (between 12th and 18th birthday) involving self-harm for Aboriginal children with a history of any type of involvement with the child protection service was twice as high (1.94%; 95% CI: 1.35-2.78%) as children with no history of involvement (0.89; 95% CI: 0.50-1.61%). The cumulative risk of a hospital admission involving self-harm appears to be greatest amongst Aboriginal boys with a history of out-of-home care and Aboriginal girls with a history of substantiations only (see Fig. 1).

3.3. Relative risk of self-harm hospital admission in adolescence associated with a history of involvement with the child protection service

After adjusting for perinatal risk factors and socio-demographic characteristics, the risk of self-harm in adolescence was greatest amongst Aboriginal children with a history of substantiated maltreatment (which includes OOHC in this analysis) in both early and middle childhood (SS), who were nine times more likely to experience self-harm in adolescence compared to their general population peers. Children with a history of notifications in early childhood and substantiated maltreatment in middle childhood (NS) were 6 times more likely to experience self-harm in adolescence compared to children with no history of child protection involvement. There was no evidence of a higher risk of self-harm in adolescence amongst children with other patterns of child protection service involvement across both early and middle childhood (i.e. NN and SN). Of the Aboriginal children in this study with a history of involvement with the child protection service in only one period of childhood, it was those with contacts in middle childhood (i.e. *N and *S) that were at greater risk of self-harm in adolescence. These results suggest that middle childhood, between 5 and 10 years of age, is a particularly sensitive period in which the impact of child protection concerns on the risk of self-harm in adolescence are greatest. The relative risk of self-harm in adolescence is seen to increase with the level of child protection involvement in middle childhood – that is, relative to their general population peers, the risk of self-harm in adolescence appears to be more elevated amongst Aboriginal children with substantiated maltreatment compared to those who experience only notifications for maltreatment in middle childhood.

Furthermore, a history of child protection involvement carried the greatest explanatory value (Royston R^2) of all variables used in the Cox regression model. It alone (R^2_{CM}: 0.236) accounted for approximately half of the total variation in the outcome explained by the full model (R^2_{Full}: 0.425).

4. Discussion

This study confirms the risk of self-harm in adolescence is greater for Aboriginal children involved with child protection services. After adjusting for socio-demographic characteristics and well-known perinatal risk factors, a history of involvement with child protection services represents a 3- to 9-fold increased relative risk of self-harm in adolescence. Notably, this relative risk of self-harm in adolescence appears to increase with level of child protection service involvement and is greatest amongst children with a substantiated report of maltreatment. The results also suggest that middle childhood may be a particularly vulnerable period in which the impact of child protection concerns carries the greatest risk for self-harm in adolescence. Furthermore, child protection service involvement carried the greatest explanatory value in the modelling, suggesting it represents a critical opportunity for preventing self-harm in adolescence.

These findings reinforce the need for prevention and early intervention to reduce the risk of child maltreatment and with it, therefore, the associated risk of self-harm and other adverse outcomes in adolescence and later life (Angelakis et al., 2019; Miller et al., 2013). Culturally informed universal nurse home visiting programs for Aboriginal families and their children offer one relevant approach to the primary prevention of maltreatment. By improving access to appropriate health care, promoting early attachments, and fostering a nurturing family environment these programs address a range of issues in early childhood that reduce the risk of maltreatment (Segal, Nguyen, Gent, Hampton, & Boffa, 2018) and are likely to contribute to reducing the risk of subsequent self-harm. The evidence from this study suggests early childhood involvement with child protection services represents an important opportunity for reducing the cumulative harm of maltreatment across childhood that carries a greater risk of self-harm in adolescence. Therefore, for Aboriginal families and children who do come to the attention of child protection services, there is a need for referral pathways into family support and parenting programs that have demonstrated high levels of acceptability and promising evidence of improvements

to psychosocial functioning in Aboriginal children that (Macvean, Shlonsky, Mildon, & Devine, 2017) are likely to reduce the risk of subsequent self-harm.

The greater risk of self-harm in adolescence conferred by childhood maltreatment may be attributable to pre-existing intergenerational trauma (Dudgeon, Calma, & Holland, 2017), well-known developmental impacts of maltreatment experiences (Bruffaerts et al., 2010), or both. It is, therefore, vital that culturally responsive therapeutic interventions are available that not only identify and address the intergenerational trauma of Aboriginal families and children who meet the threshold for a statutory response but are also made available to those within their wider kinship network and community. For example, there are cultural models of kinship care arrangements that have been developed to provide cultural supports that not only seek to address the needs of traumatised children, but also amongst kinship carers themselves (Kickett, Chandran, & Mitchell, 2019). A cultural model of time-limited and intensive therapeutic residential care has been developed in Victoria, Australia that may be more suited to children not meeting the threshold for OOHC. This program exemplifies a trauma-informed approach to therapy and combines this with participation in community and cultural programs that attempts to reconnect children to important cultural relations and practice (Bamblett, Long, Frederico, & Salamone, 2014). It is holistic approaches such as these that may hold the greatest potential to address and prevent the underlying causes of self-harm by Aboriginal adolescents that can be attributed to child maltreatment.

The results of this study may also point to the child protection system's failures to prevent longer-term adverse outcomes, such as self-harm, by focusing on short-term interventions and individual treatment related to child welfare concerns. Although such conclusions cannot be clearly drawn from the results of this study, they suggest further research and evaluation is needed of what therapeutic treatments are currently offered to Aboriginal children involved with the child protection service or in OOHC. Additionally, the general findings reinforce calls for the reform of child protection services towards more holistic and coordinated approaches that identify and address the intergenerational trauma underlying child protection concerns of Aboriginal families and children as well as the wider impact amongst kin and community. The effectiveness of such an approach has been demonstrated in Native American communities that have adopted community-wide trauma-informed domestic violence prevention and family support programs to identify and address child welfare concerns as part of a culturally-based public health approach to suicide prevention (May, Serna, Hurt, & DeBruyn, 2005). Although the effectiveness of culturally informed initiatives have yet to be rigorously evaluated in Australia, they have demonstrated engagement of Aboriginal families and children that represent a critical milestone to ensuring the effectiveness of statutory responses and related interventions (Lindstedt, Moeller-Saxone, Black, Herrman, & Szwarc, 2017) in the context of negative contemporary and discriminatory historical experiences of child protection (Royal Commission into the Protection & Detention of Children in the Northern Territory, 2017). The improved effectiveness of the child protection system will not only improve responses to short-term child safety outcomes resulting from maltreatment, but to should better foster the social and emotional wellbeing (SEWB) of Aboriginal children over time (Lindstedt, Moeller-Saxone, Black, Herrman, & Szwarc, 2017), which is deemed critical to reducing the longer-term risk of suicide-related behaviours (Dudgeon, Bray, & Walker, 2020).

Sustained longer-term efforts to support Aboriginal families and children to address intergenerational trauma is further supported by findings from this study relating to the developmental timing of child protection involvement. The clear impact on the risk of self-harm associated with any type of involvement in middle childhood suggests that any gains from investments in early childhood development can quickly be erased or reversed by adverse and harmful experiences in middle childhood. Therefore, child protection service responses to maltreatment in middle childhood are an opportunity to refer children and families for assessment to identify important developmental precursors to self-harm in adolescence. This should not only include assessing the risk of early onset mental health and behavioural problems to identify individual therapeutic needs for children (Abdelraheem et al., 2019), but assessments of the strengths and needs of families that can inform referrals to appropriate programs and services designed to restore family functioning and build supportive relationships that play an important protective role throughout childhood when it comes to reducing the risk of suicide-related behaviours (Fergusson, Woodward, & Horwood, 2000). Just as importantly, in the absence of substantiated maltreatment, Aboriginal families considered at-risk should be referred to early intervention strengths-based parenting programs that have shown promise in reducing problem behaviours considered to be associated with later suicide-related behaviours (Robinson, Tyler, Silburn, & Zubrick, 2013).

What is evident from the available research for Aboriginal children and families with child protection concerns is that the socio-

Table 3
Estimates of relative risk[a] of first self-harm hospitalisation associated with level and timing of child protection service involvement, NT Aboriginal children born in 1999-2003.

		Middle Childhood		
		No CPS Involvement (*)	Notification Only (N)	Substantiation Only (S)
Early Childhood	*	1.00[b]	3.08** (1.43–6.63)	3.08* (1.24–7.79)
	N	1.21 (1.24–7.79)	3.43 (0.97–12.12)	6.72*** (2.16–20.90)
	S	1.41 (0.20–11.38)	2.09 (0.27–16.11)	9.11*** (3.39–24.46)

[a] Presented as hazard ratios (and confidence interval) estimated from multivariable Cox regression models adjusting for confounding influence of socio-demographic and perinatal characteristics.
[b] HR of 1.00 indicates reference category.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

cultural dimensions of family and kin relationships hold the greatest potential therapeutic benefit and should, therefore, form the basis of approaches to prevention and intervention that can contribute to reducing the risk of self-harm in adolescence and later life. Recommendations for holistic and healing approaches to prevention and reform are common to other countries with similar post-colonial histories to Australia, such as Canada where a history of child removals through the residential system and its impact on contemporary suicidal behaviour are also well-established (Kral, 2016). In recognition of the traumatic effect that the historical forced removal of children has had, child protection policies in Australia prioritise keeping Aboriginal children with Aboriginal families because they not only provide security, safety, and stability but can nurture cultural attachments necessary to identity-formation processes that underpin healthy development (Arney, Iannos, Chong, McDougall, & Parkinson, 2015). Moreover, these nurturing relationships within family are considered central to the fostering and maintenance of SEWB throughout childhood that mitigates the risk of suicide-related behaviours in adolescence and later life (Dudgeon, Bray, & Walker, 2020). It is therefore critical that Aboriginal knowledge informs the approaches to identifying the culturally specific needs of Aboriginal families and children. Aboriginal specific trauma-informed approaches to the reform of child protection programs and services are required at all levels of responses to ensure the culturally-specific unmet needs of Aboriginal families and children are better recognised and addressed (Atkinson, 2012). However, further research is needed to strengthen the existing evidence-base in the Australian context by further evaluating the implementation and outcomes, such as self-harm, of promising culturally-informed interventions designed to improve the quality and appropriateness of service and care provided to Aboriginal children and families (Table 3).

5. Strengths and limitations

This population-level study has clearly highlighted that the timing and level of involvement with child protection services are critical dimensions for understanding the risk of self-harm amongst Aboriginal adolescents and identifying opportunities for prevention. Whilst this is the first known longitudinal study of the impact of child protection service involvement on adolescent self-harm in an Aboriginal population, it is worth noting that reliance on linked administrative data does not capture some of the critical social and cultural dimensions of Aboriginal people's experiences that may benefit from mixed methods approaches. Such an approach would also allow the collection of data on modifiable risk and protective factors not readily available in administrative data that would illuminate the underlying mechanisms of risk unavailable in this study that could be targeted for preventive intervention. Similarly, further research with larger samples should also investigate any differences in outcomes associated with different types of maltreatment that could further inform the design of preventive interventions. It should also be noted that increasing secular trends in notifications to the child protection service may have biased estimates of timing, despite adjustment by year of birth in the multivariate regression. Lastly, the limited scale of administrative child protection data for the whole population in a small jurisdiction such as the NT has affected the reliability of the estimates produced due to the small number of outcomes to be analysed. It is hoped the results and findings of this study encourage further research of the childhood determinants of suicide-related behaviours in Aboriginal populations that make appropriate use of linked administrative data.

6. Conclusion

The elevated risk of self-harm by Aboriginal adolescents associated with increasing levels of child protection service involvement highlights the need for prevention and early intervention of maltreatment. The risks associated with the timing of child protection involvement also suggests that developmentally appropriate approaches to statutory responses and preventive intervention are needed at different levels of the system. Aboriginal perspectives and experiences of child protection point to the need for these to be culturally responsive and trauma-informed. Cultural models of relevant initiatives exist that also reinforce the need for public health approaches that encourage a holistic view of Aboriginal families and children, but more rigorous research is needed to better evaluate child protection responses and outcomes. Because contemporary experiences of maltreatment and self-harm amongst Aboriginal people are seen as stemming from the pervasive intergenerational trauma of Australia's colonial past, a strategic approach to prevention requires reducing the risk of maltreatment in the first place and longer-term sustained efforts at building the SEWB of at-risk Aboriginal children and families. This study's findings and the available evidence suggest that child protection system reforms are urgently needed to ensure culturally appropriate responses to child protection concerns and better coordination with the preventive efforts of other services and programs working at the level of individuals, families and communities to address the multiple and complex influences leading to self-harm amongst Aboriginal adolescents.

Ethical approval

The study was approved by the Human Research Ethics Committee of the NT Department of Health and the Menzies School of Health Research (HREC-2016-2708).

Acknowledgements

The authors would like to acknowledge the advice and guidance provided by Professor Pat Dudgeon. We would also like to acknowledge the support and funding provided by all NT Government agency partners to CYDRP and the custodians of the data we have been provided. This paper does not necessarily reflect the views of NT Government agencies and other partners to CYDRP. We thank SA NT DataLink for linking the records that comprise the repository supporting this program of research.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.chiabu.2021.104931.

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