

Safe Infant Sleep Practices and Associated Factors Among Mothers Attending Vaccination Service at Dessie Town Governmental Health Care Facilities, 2021

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ABSTRACT

BACKGROUND: Babies spend a lot of their time with sleeping thus they need to have a safe sleep. Inadequate sleeping arrangements might heighten the likelihood of Sudden Unexpected mortality in Infancy (SUDI), including SIDS and lethal sleeping mishaps, which continue to be the most prevalent cause of mortality for individuals aged 1 to 1 year.

OBJECTIVE: The study aimed to assess safe baby sleep practices and associated factors among women receiving immunizations at government healthcare facilities in Dessie Town.

DESIGN: An institution-based cross-sectional study

METHODS: We conducted interviews with a total of 392 mothers using semi-structured questionnaires at public health facilities of Dessie town, in 2021. After the data were entered into the EPI data version 3.1, SPSS 23 was utilized for the analysis. Additionally, multivariate and binary logistic regression analyses were carried out. In multivariate analysis, a *P*-value less than .05 indicate a significant association.

RESULTS: About 38.3%, 21.9%, and 14.7% had safe infant sleep practice regarding sleep position, no soft-bedding and sleep arrangement respectively. Significant association was observed between safe infant sleep position with baby age less than 3 months (AOR = 2.96, 95% CI = 1.50-5.84), baby age of 7 to 9 months (AOR = 3.84, 95% CI = 2.15-6.85), maternal level of education (AOR = 4.48, 95% CI = 1.87-10.76), relative/friend as their source of information (AOR = 1.98, 95% CI = 1.14-3.44), grandmother as their source of information (AOR = 1.89, 95% CI = 1.00-3.57). Additionally, baby age 4 to 6 months (AOR = 0.93, 95% CI = 0.19-0.94) and maternal level of education (AOR = 0.19, 95% CI = 0.04-0.92) shows a significant safe infant bed arrangement practice. Furthermore, baby age of 10 to 12 months (AOR = 0.49, 95% CI = 0.25-0.98) and maternal education level of college and above (AOR = 3.44, 95% CI = 1.18-10.03) also shows significant association with safe soft-bedding practice.

CONCLUSION: Mothers' safe infant sleep practices were found to be low in Dessie town. Therefore, efforts should be made to enhance mothers' attentiveness and engagement. This will help them follow healthy infant sleep practices.

KEYWORDS: Safe sleep, infants, Dessie, Ethiopia, 2021

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Introduction

For the body to grow, develop, and heal itself, sleep is essential. This is particularly true for newborns and infants in their first year of life. Development proceeds rapidly at this stage.¹ A baby will spend 14 or more hours a day sleeping.²

Infants should always be put to sleep entirely on their backs.³ As it is recommended by the revised AAP guideline, babies should sleep on a firm, flat sleep surface by sharing the room with parents (but not a bed). The sleep area must be clear of soft object (like pillows, pillow-like toys, quilts, comforts, matters, and toppers) and loose bedding (blanket and non-fitted sheets).⁴ A safe sleeping environment can lower the chance of all baby sleep-related deaths. Experts advise supine positioning, using a hard sleep surface, room sharing without bed sharing, avoiding soft bedding, and staying warm.⁵

About 3500 newborn deaths each year in the US are attributed to sleep-related causes. These include unintentional bed

suffocation, strangling, Sudden Neonatal Death Syndrome (SIDS), and other unknown reasons.⁶ SIDS causes unpredictable, sudden, silent, and quick death during sleep with no signs of suffering to a previously healthy infant.⁷ SIDS is one of the main causes of death in the first year of life. It accounts for about 30% of post-neonatal fatalities that occur between 1 month and 1 year of age.⁸ Research has demonstrated a link between risky sleeping habits and SIDS. A baby is safest when they sleep in a cot by themselves, on their back.⁶

So safe sleep practices should be screened for and recommended by health care professionals during all visits in the first year of the infant's life.⁹

The most common injury-related fatality in children under 1 year of age is accidental asphyxia. Over 3-quarters of baby asphyxia deaths result from accidental suffocation or strangling in bed.¹⁰ An unsafe sleep environment has been linked to 6 baby deaths in Nottinghamshire each year, on average. The



deaths affect infants younger than 15 months old. It may be possible to avert these deaths.¹¹

There were 15 child deaths reviewed in Hull between April 2008 and December 2016 featured characteristics associated with increased risk of sudden infant death. Some infant deaths have been confirmed as being caused through sleeping in the same bed, or on a sofa, with an adult/s or an older child.¹²

A study conducted in Zambia shows that side sleeping position was preferred and perceived to be safer for the infant with most believing the supine position posed an aspiration or choking risk to the infant. Bedsharing was also preferred and perceived to be convenient for breastfeeding and monitoring of the infant. Experienced family members such as grandmothers and mothers-in-law, and health care workers were frequently cited as sources of information on infant sleep position.¹³

An infant's chance of dying increases fivefold if they are put to sleep on soft surfaces. They have a 21-fold greater chance of dying if they are put to sleep on their stomach in addition to a soft surface. The causes for unsafe sleep practice in infant may be due to cultural differences, family members giving incorrect advice, media sharing wrong messaging, financial hardship, or not aware of safe sleep.¹⁴

Mothers have a vital role in performing safe infant sleep recommendations for their infant. However, there are no studies to assess the Safe Infant Sleep Practices and Associated factors among mothers in our country, Ethiopia.

Thus, it is suggested that this study determine the safe infant sleep practices of mothers in Dessie Town as well as the factors that influence them. Identifying opportunities to enhance community health is highly important. Ensuring safe sleep for infants is also highly important.

Methods

Study design, area, and period

From November 1 to November 15, 2021, researchers conducted an institution-based cross-sectional study. They aimed to assess safe infant sleep practices and associated factors among mothers at public health facilities in Dessie Town. The settlement is located 480 km from Bahir Dar and 401 km from Addis Ababa

Population

Mothers whose infants were receiving vaccinations at governmental health institutions at the time of data collection made up the study population. The study included mothers. Their infants received vaccination services at all government health institutions in Dessie town. Mothers who had hearing problems or had trouble talking were not included in the study.

Sample size determination

The sample size was determined using the single population proportion calculation. It assumed a 50% proportion, a Z value

of 1.96, and a 5% marginal error. With a 5% non-respondent adjustment, a total sample size of 403 was required.

Sampling procedure

This suggests that a specific proportion of mothers from each healthcare facility was added to produce the sample size. Participants in the study were selected using a systematic sampling technique. Every other client at each health center was interviewed.

Data collection instrument and procedure

All data collectors and supervisors received 2 days of training regarding their roles, including explaining the goal of the study, gathering data, and emphasizing to clients the value of providing truthful and sincere answers to the questions. The researchers and their supervisors closely monitor the overall data collecting activities daily. They do this to make sure the questionnaires are completed and to provide extra clarification.

Study Variable

Dependent variables

- Safe infant sleep practices

Independent variables

- Socio-demographic factors (baby age and sex, mother age, mother education, mother occupation, father education,
- Source of information.

Operational definitions

Sleep arrangement. Sleep arrangement is a sleeping arrangement, in which an infant shares the same bed as an adult, another child, or pet.¹⁵

Soft bedding. Soft bedding is the presence of materials (blankets, pillows, bumper pads, soft toys, and the like) on child bed. It is advised to keep soft toys, bumper pads, blankets, pillows, and other bedding away from the baby's sleeping space.¹⁶

Sleep position. Sleep position is the direction or the way a child slept on bed. The recommended sleep position for an infant is back. Babies sleep safest on their backs.¹⁷

Safe infant sleep practice. Safe infant sleep practice was assessed using the ABC's of safe sleep recommendation (Alone, Back, and Crib). Alone—babies should always be on their own sleep surface. Back—babies should be on their back for every sleep. Crib—There should be nothing in the crib. This includes all toys, stuffed animals, bumper pads, blankets, pillows, and supplies like diapers and wipes.¹⁸

Data quality assurance

Supervisors and data collectors received training. At Tita Health Center, a pretest using 5% of the total sample size was done. The goal was to assess the questionnaire's comprehensibility, clarity, and ease of use in gathering data for the intended purposes. Following that, revisions were made in accordance with the feedback and criticisms received during the pretest.

Subsequently, the finalized questionnaires were duplicated. The primary investigator reviews each questionnaire to guarantee the accuracy of the information gathered that evening on the collection date.

Data analysis procedure

Data entry was done using Epi Data version 3.1, which was then exported into SPSS version 23 for analysis. We performed binary and multiple logistic regression analyses. We were evaluating the relationship between independent and dependent variables. At P value of less than .05, a significant connection was determined.

Result

Characteristics of the study participants

A total of 392 mothers participated in this study. About 156 (40%) of them were aged 26 to 30 years. About 180 of them have infants aged less than 3 months. Most of them (59%) were Muslim in their religion and more than 95% of the respondents were married. Regarding the educational level, 264 (67%) of the mothers were educated from grade 1 to 12. Their husbands' education level was the same: 240 (61%). About the occupation, around 75% of the mothers are housewife. More than 85% of the respondents have 1 to 3 children as shown by the table below (Table 1).

Sleep position

The study showed that only 38% of the participants practiced supine (back) sleep position and the side sleep position were practiced 62 % by of the participants. None of the participants practice prone position to sleep their infant.

Sleep arrangement

he study showed that only 56 (14%) of the participants practiced the safe sleep arrangement for their infant.

Soft bedding

Regarding soft-bedding, more than half (55%) of the respondents stated that their infants' beds had blankets or duvets. About 22% of them reported that their infants' beds had no soft bedding. This is shown in the accompanying table (Table 2).

Mothers source of information about safe infant sleep practices

About half, 192 (49%), of the participants say they get information from relatives or friends. One-fourth, 102 (26%), say they get information from their grandmother. This information is shown in the table below (Table 3).

Association of independent variables with safe infant sleep position

A significant association was shown between a child's age and safe infant sleep position. Mothers with infant aged 4 to 6 months were more likely to use the safe position than mothers with infant under 3 months (aOR=2.96, 95% CI=1.50-5.84). Similarly, mothers who had babies aged 7 to 9 months were more likely to practice safe infant sleep positions than mothers with babies aged less than 3 months (aOR=3.84, 95% CI=2.15-6.85). Furthermore, mothers with babies aged 10 to 12 months were more likely to safely position their infants for sleep than mothers with babies under 3 months old (aOR=4.34, 95% CI=2.08-9.02)

Significant association was also observed between maternal level of education and safe infant sleep position. Mothers with a college education or higher were more likely to practice safe infant sleep position than those with no formal education (aOR=4.48, 95% CI=1.87-10.76).

Additionally, mothers who described a relative or friend as their source of information regarding safe infant sleep practices were more likely to practice safe infant sleep positions than those who described a healthcare professional as their source of information. (aOR=1.98, 95% CI=1.14-3.44). Moreover, mothers who saw their grandmother as their safe sleep source were more likely to practice safe sleep than those who turned to healthcare professionals (aOR=1.89, 95% CI=1.00-3.57; Table 4).

Associated factors for safe infant sleep arrangement

There was a significant association between baby age and safe infant bed arrangement. Mothers with babies aged 4 to 6 months were less likely to practice safe infant bed arrangement than mothers with babies aged under 3 months (aOR=0.93, 95% CI=0.19-0.94).

Significant association was also observed between maternal level of education and safe infant bed arrangement. Mothers with a college education or higher were less likely to practice safe infant bed arrangement than those with no formal education (aOR=0.19, 95% CI=0.04-0.92). This is shown in the table (Table 5).

Associated factors for soft-bedding

A significant association was observed between baby age and safe soft-bedding practices. Mothers with babies aged 10 to

Table 1. Demographic Characteristics of the Study Participants (n=392).

S.NO	VARIABLE		FREQUENCY	PERCENT (%)
1.	Mother age	≤20	24	6.1
		21-25	150	38.3
		26-30	156	39.8
		31-35	44	11.2
		≥36	18	4.6
2.	Infant age (mo)	Below 3	180	45.9
		4-6	58	14.8
		7-9	98	25.0
		10-12	56	14.3
3.	Religion	Orthodox	160	40.8
		Muslim	232	59.2
4.	Marital status	Single	10	2.5
		Married	378	95.9
		Divorced	6	1.5
5.	Mother education	No formal education	74	18.9
		Grade 1 to 12	264	67.3
		College and above	54	13.8
6.	Mother occupation	House wife	294	74.5
		Employee	58	14.8
		Others (daily laborer, farmer, or merchant)	42	10.7
7.	Number of children	1-3	334	85.2
		4-6	52	13.3
		More than 6	6	1.5
8.	Husbands education status	No formal education	78	19.9
		Grades 1-12	240	61.2
		College and above	74	18.9

Table 2. Soft-Bedding Practice of Mothers (N=392).

S.NO		FREQUENCY (N)	PERCENT (%)
1.	Nothing on the bed	86	21.9
2.	Blanket/duvet	217	55.4
3.	Pillow	58	14.8
4.	Soft toys	31	7.9

12 months were less likely to practice safe infant soft-bedding (no soft bedding) than mothers with babies aged less than 3 months (aOR = 0.49, 95% CI = 0.25-0.98).

Table 3. Source of Information Regarding Safe Infant Sleep Practice (N=392).

S.NO		FREQUENCY (N)	PERCENT (%)
1.	Health care professionals	98	25
2.	Relatives/friends	192	49
3.	Grande mother	102	26

Significant association was also observed between maternal level of education and safe infant soft-bedding practice. Mothers with a college education or higher were more likely to use safe

Table 4. Factors Associated With Sleep Position (N=392).

VARIABLES	SLEEP POSITION		ODDS RATIO, AT 95% CI			
	SAFE	UNSAFE	CRUDE	P VALUE	ADJUSTED	P VALUE
Mother age (y)						
≤20	6	18	1			
21-25	62	88	0.473 (0.178-1.260)	.134	0.488 (0.171-1.391)	.180
26-30	62	94	0.505 (0.190-1.344)	.171	0.544 (0.190-1.554)	.255
31-35	10	34	1.133 (0.354-3.623)	.833	1.358 (0.374-4.937)	.642
≥36	10	8	0.267 (0.072-0.989)	.048	0.291 (0.068-1.241)	.095
Baby age (mo)						
≤3	96	84	1		1	
4-6	18	40	2.540 (1.354-4.762)	.004	2.958 (1.499-5.836)	.002
7-9	24	74	3.524 (2.042-6.081)	.000	3.838 (2.152-6.847)	.000
10-12	12	44	4.190 (2.076-8.458)	.000	4.327 (2.075-9.024)	.000
Level of education						
No formal education	32	42	1		1	
Grade 1 to 12	106	158	1.136 (0.674-1.913)	.633	1.641 (0.890-3.026)	.113
College and above	12	42	2.667 (1.211-5.872)	.015	4.480 (1.865-10.763)	.001
Source of information						
Health care professional	50	48	1		1	
Relative/friend	66	126	1.989 (1.212-3.264)	.007	1.984 (1.144-3.439)	.015
Grand mother	34	68	2.083 (1.177-3.689)	.012	1.892 (1.002-3.570)	.049

infant bedding than those with no formal education (aOR = 3.44, 95% CI = 1.18-10.03), as shown in the table (Table 6).

Discussion

The present study investigates the prevalence of safe infant sleep practices and associated factors among mothers attending governmental health facilities in Dessie town. Declining child morbidity and mortality is the recent approach of the Ethiopian government. Therefore, safe infant sleep practices are vital aspect in maintaining children's health.

This study finding shows that only 150 (38%) of the participants practiced supine (back) sleep position. This is lower than the study conducted in Brazil, Massachusetts, Saudi Arabia, and Maryland, which showed that about 55.4%, 43.7%, 61.9%, 78%, and 81% of the study participants practice safe infant sleep position (back sleep position).¹⁹⁻²³ This difference may be due to the participants' ages, study settings, and study areas. But this study result was in line with the study conducted at Jimma town, Ethiopia, which showed about 33.5% of the respondent use safe infant sleep position (supine).²⁴

However, this study result is higher than the study conducted in Nigeria and Zambia. It showed that only about

18.1% and 6.7% of the study participants use the back sleep position for their infant.^{25,26} The differences in prevalence rates may be explained by socioeconomic and cultural differences in the populations assessed in these studies.

Regarding safe infant sleep arrangement, this study shows about 56 (14%) of the participants practiced the safe sleep arrangement for their infant. This is lower than the study in Maryland. It shows about 57.1% of participants practiced safe sleep arrangements for their infants.²² This discrepancy may attribute to difference in study setting and cultural difference.

Regarding safe soft bedding, this study result shows 86 (22%) of them states that nothing is found on their infants' bed (practice no soft bedding). This is lower than the study conducted in Maryland (Betsada). This study reported that 42.4% of participants avoid soft bedding.²² But it is higher than the study in Saudi Arabia which shows only about 6.9% did not use any soft bedding.²¹ This discrepancy may attribute to difference in study setting and cultural difference.

Regarding the independent variables, mothers with babies aged 4 to 6 months were more likely to practice safe infant sleep position than mothers with babies under 3 months (aOR = 2.96, 95% CI = 1.50-5.84). Similarly, mothers with

Table 5. Associated Factors for Safe Infant Sleep Arrangement.

VARIABLES	SLEEP ARRANGEMENT		ODDS RATIO, AT 95% CI			
	SAFE	UNSAFE	CRUDE	P VALUE	ADJUSTED	P VALUE
Baby age (mo)						
≤3	22	158	1		1	
4-6	14	44	0.438 (0.207-0.925)	.031	0.420 (0.187-0.942)	.035
7-9	10	88	1.225 (0.555-2.704)	.615	0.931 (0.409-2.119)	.866
10-12	10	46	0.641 (0.283-1.449)	.285	0.588 (0.249-1.390)	.227
Maternal level of education						
No formal education	6	68	1		1	
Grades 1-12	32	232	0.640 (0.257-1.594)	.337	0.436 (0.157-1.211)	.111
College and above	18	36	0.176 (0.064-0.484)	.001	0.186 (0.038-0.918)	.039
Occupation						
Housewife	38	254	1		1	
Employed	16	42	0.393 (0.201-0.767)	.006	1.343 (0.385-4.688)	.644
Other	2	40	2.992 (0.695-12.890)	.141	2.623 (0.594-11.579)	.203
Husband education						
No formal education	12	66	1			
Grades 1-12	22	218	1.802 (0.846-3.835)	.127	1.952 (0.837-4.555)	.122
College and above	22	52	0.430 (0.195-0.949)	.037	0.825 (0.279-2.433)	.727

Table 6. Associated Factors for Soft-Bedding.

VARIABLES	SOFT-BEDDING		ODDS RATIO, AT 95% CI			
	SAFE	UNSAFE	CRUDE	P VALUE	ADJUSTED	P VALUE
Baby age (mo)						
≤3	35	145	1		1	
4-6	10	48	1.159 (0.534-2.515)	.710	1.159 (0.525-2.561)	.715
7-9	23	75	0.787 (0.434-1.428)	.431	0.837 (0.458-1.529)	.563
10-12	18	38	0.510 (0.260-0.997)	.049	0.492 (0.248-0.975)	.042
Maternal level of education						
No formal education	19	55	1		1	
Grades 1-12	62	202	1.126 (0.621-2.039)	.696	1.109 (0.603-2.040)	.738
College and above	5	49	3.385 (1.176-9.749)	.024	3.443 (1.182-10.034)	.023

babies aged 7 to 9 months were more likely to practice safe infant sleep positions than mothers with babies under 3 months (aOR = 3.84, 95% CI = 2.15-6.85). Furthermore, mothers having baby age of 10 to 12 months were also more likely to have safe infant sleep position practice than mothers having baby age of less than 3 months (aOR = 4.33; 95% CI = 2.08-9.02).

This might be because as a baby ages, they become more mature. Then, the mother is able to sleep the baby on their back, through exposing the infant to this position. This happens later than at early stages.

On the other hand, mothers with educational level of college and above were more likely to practice safe infant sleep

position than those mothers with no formal education (aOR=4.48, 95% CI=1.87-10.76). As a mother becomes more educated, they can easily update themselves on important issues regarding their infants from different sources.

Mothers who described a relative or friend as their source of information about safe infant sleep were more likely to practice safe infant sleep position. In contrast, those who described a healthcare professional as their information source were less likely to do so. (aOR=1.98;95% CI=1.14-3.44). Mothers who described their grandmother as their source of safe infant sleep information were more likely to practice safe sleep positions than those who described healthcare professionals as their source (aOR=1.89, 95% CI=1.00-3.57). This might be due to the fact that family members are able to describe things in understandable way and may show practically because they are near to them than just a simple advising provided by healthcare professional. Moreover, grandmothers play an important role in maternal and child care in Ethiopia and Africa.

Significant association was observed between baby age and safe infant bed arrangement, mothers having baby age of 4 to 6 months were less likely to practice safe infant bed arrangement than mothers having baby age of less than 3 months (aOR=0.93, 95% CI=0.19-0.94). This might be due to the mother becoming less conscious about the arrangements of the infant bed as the baby age increases.

In addition, significant association was also observed between maternal level of education and safe infant bed arrangement. Mothers with a college education or higher were less likely to practice safe infant bed arrangement than mothers with no formal education (aOR=0.19, 95% CI=0.04-0.92).

A study in Saudi Arabia shows that those mother who have university degree or higher were more likely to have unsafe practices regarding bed-sharing ($P < .05$; aOR=1.59, 95%; CI=1.10-2.31).²¹ This might be related. As a mother becomes educated, she becomes employed and spends less time with their child at home. She has to rearrange the bed where their infant slept.

In relation to soft bedding, we found a link between baby age and safe soft bedding practices. Mothers with babies aged 10 to 12 months were less likely to use safe soft bedding practices than mothers with babies under 3 months (aOR=0.49, 95% CI=0.25-0.98). This may be due to maternal negligence because of the baby's maturity. Mothers with a 10- to 12-month-old baby may assume that their infant is mature enough. They may think that things like blankets and pillows around the bed did not disturb their infant.

In addition, significant association was also observed between maternal level of education and safe infant soft-bedding practice (means no soft bedding). Mothers with a college education or higher were 3.4 times more likely to have safe infant soft-bedding practices than mothers with no formal education (95% CI=1.18-10.03). This might be because educated people have access to updates and are eager to learn new things they may not know.

Limitation of the Study

Eventhough this study findings have a value in benchmarking of current practices against national recommendations and evidence for priority areas to develop and improve strategies to increase consistency of safe infant care practice, it has some imitations. Firstly, the questionnaire asked only for the usual place of sleep and did not investigate practices related to unplanned sleeping, knowing that many deaths occur when sleep is unplanned on an unsafe surface (such as a couch and sofa). And also self-reported questionnaire does not necessarily describe the actual behavior of the study participants. Our study did not ask about preterm or low birth weight infants, which could be an important factor that might affect their safe sleep practices.

Conclusion

The study finding shows that very few mothers found to have safe infant sleep practice. This was true for infant sleep position (38%), infant sleep bed arrangement (14%), and avoiding soft bedding (22%). This may show that majority of the infants were exposed to infant care practices that have been linked to SIDS. Factors like baby age, maternal education, and source of information were found to have a significant association with safe infant sleep practices.

Since no other comparable studies have been carried out on safe infant sleeping practices in Ethiopia, our results will serve as the foundation for the growth of health education initiatives. Since the safe infant sleep practices are low, we recommend the health care provider to inform mothers about the recommended safe infant sleep practice and further study should be using study design other than cross-sectional, a qualitative approach and using observation focused checklist.

Declarations

Ethical Approval and Consent to Participate

The Wollo University College of Medicine and Health Science's research and ethical review committee granted ethical clearance. The ethical clearance letter reference number is CMHS-905/13/14. Through an official process, discussions were undertaken with the administrators of the chosen kebeles in the town. The study's significance for the participants is further explained by the data collector. Before collecting any data, each mother signed a written consent form. They did this to show their willingness to participate in the study. The data that was gathered was kept private.

Consent to Publication

Not applicable.

Author Contributions

DG prepared the questionnaire and conducted data entry. DG participated in developing the study's proposal, method, and objectives. DG analyzed the data and authored the initial draft

of the publication. SG oversaw the design development of the study, completed a review of the literature, and assisted with writing the article. SG oversaw the design development of the study, completed a review of the literature, and assisted with writing the article. Both authors created and oversaw the research. They also edited and prepared the manuscript for publication. The text was read and approved by both authors.

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Competing Interests

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Availability of Data and Materials

The data will be accessible with reasonable request to the corresponding author

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