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Breastfeeding Self-efficacy and Breastfeeding Outcomes among Tunisian Mothers Delivering in a University Hospital in Sousse (Tunisia)

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Authors' contributions

This work was carried out in collaboration between all authors. Authors TNA and AM designed the study and coordinated the study. Author KD performed data collection. Author MM managed the literature searches. Author CZ managed the analyses of the study. Author JS wrote the first draft of the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Despite the benefits of breastfeeding, neither its duration, nor its exclusivity are respected by the majority of mothers. Among the modifiable factors and sensitive to the interventions of health professionals, the self-efficacy has been recognized as the most influential to improve the duration and exclusivity of breastfeeding.
Aim: We conducted this work to assess the factors associated with exclusive breastfeeding to 8 weeks and breastfeeding self-efficacy among mothers delivering in a Tunisian University Hospital.
Place and Duration of the Study: The maternity unit of the University hospital of Farhat Hached of Sousse in Tunisia during the period from 15th May to 15th June 2014 from birth to the eight postnatal weeks conducted among the mothers delivering in a Tunisian University Hospital.
Type of the Study: This is a descriptive study with longitudinal follow-up.

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Methodology: Data collection has been carried out by a questionnaire including the French version of the Breastfeeding self-efficacy scale-Short Form.
Results: The mean of the breastfeeding self-efficacy score was 44.88 ± 11.74, 95% CI [46.99-50.78]. The score of breastfeeding self-efficacy was significantly associated to age (p = .003), to maternal education (p = .02), to the intention to breastfeed (p <10^{-3}), to a previous positive experience of breastfeeding (p <10^{-3}), to the vaginal delivery (p <10^{-3}) and the exclusive breastfeeding at 8 weeks (p <10^{-3}).
Conclusion: A new perspective for breastfeeding promotion focusing on major modifiable factors, mainly breastfeeding self-efficacy, is advocated to enhance breastfeeding duration and exclusivity rates in Tunisia.

Keywords: Breastfeeding; breastfeeding self-efficacy; mothers; infant.

1. INTRODUCTION

The benefits of breastfeeding are widely recognized, consistently reproduced and well documented in the literature. Both developed and developing countries urge breastfeeding as infants, mothers, and society could profit from its health, nutritional, immunologic, developmental, psychological, social, economic, and environmental benefits [1-3].

However, the protective effect of breastfeeding, known as a 'dose-response' effect, depends on its duration and exclusivity [4]. Based on these findings, The American Academy of Pediatrics affirmed its recommendation of exclusive breastfeeding for about 6 months, aligning itself with other major health organizations such as the Academy of Breastfeeding Medicine and the World Health Organization [5,6]. Thus, current World Health Organization (WHO) and the United Nations International Children's Emergency Fund (UNICEF) recommendations for optimal infant feeding are exclusive breastfeeding for approximately the first 6 months postpartum, after which complementary food should be introduced gradually, with the continuation of breastfeeding until 2 years or beyond [6].

In spite of these wide recommendations added to their known benefits, neither the advocated breastfeeding duration nor its exclusivity is respected by the majority of mothers in both developed and developing countries [7-10]. In Tunisia, only 8.5% of infants aged less than six months are exclusively breastfed [11].

Factors that affect breastfeeding duration and exclusivity are various and complex. A plethora of research has focused on identifying these factors including socio-demographic, bio-physical, and psychosocial [12].

However, despite the valuable indicators they could provide to health care providers to identify who might be at risk for prematurely breastfeeding cessation for a better intervention and support, many of these factors as wide social determinants, like maternal age, marital status and education, are neither easily modifiable nor especially amenable to interventions in themselves [13].

Modifiable factors influencing breastfeeding duration and exclusivity and susceptible to support interventions are therefore needed to be elucidated by health care professionals [14]. From these amenable to intervention factors, breastfeeding confidence and breastfeeding self-efficacy have been recognized important ones that would be even attested the most influential on breastfeeding outcomes [15].

Nonetheless, regarding the complexity of confidence as a psychological trait as well as the lack of clear conceptualization and standardized method of measurement in prior research, Dennis [16] developed the breastfeeding self-efficacy theory based on Bandura's social learning theory and constructed the breastfeeding self-efficacy scale [14] which has been used in several studies and has proved to be valid and reliable. Self-efficacy is the personal belief that one can effectively perform a given behavior and that the behavior will result in the desired outcome [17]. Breastfeeding self-efficacy is therefore defined as a mother's perceived confidence in her ability to breast feed her baby [16]. This concept is then a potentially modifiable variable that presents a clear definition, a theoretical framework and a valid measurement tool [16].

In several studies, self-efficacy has been connected, as a predictive variable, to breastfeeding duration and exclusivity at 4, 6, 8

and 16 weeks among mothers in Canada [18], Australia [19,20], Puerto Rico [21], and China [22], whereas this issue has not been explored among Tunisian mothers yet. In Tunisia, promotion and support of breastfeeding have emerged as a crucial part of national policy on behalf of the child health and have been of greater concern to public health [23], but existing breastfeeding promotion strategies often do not address this important and potentially modifiable factor. This research intended to fill this gap in the Tunisian context.

In this context we conducted this study to scrutinize the relationship between breastfeeding self-efficacy and exclusive breastfeeding at 8 weeks postpartum and to determine factors affecting breastfeeding self-efficacy. It also examined the relationship between exclusive breastfeeding at 8 weeks postpartum respectively with socio-demographic variables, bio-physical variables and the intended duration to breastfeed.

2. MATERIALS AND METHODS

2.1 Study Design and Setting

This is cohort study conducted among mothers delivering in the maternity unit of the public University hospital of Farhat Hached located in Sousse city in Tunisia. The longitudinal follow-up of breastfeeding outcomes was insured at one week and at the eight weeks postpartum.

2.2 Study Population

This study used a non-probability sampling with convenience form, also known as accidental sampling. Although this type of sampling may not represent the population as a whole, it takes the advantages of availability and quickness with which data can be gathered [24]. The sample comprised 150 mothers who gave birth during the period from 15th May to 15th June. In fact, the sample size was calculated on the basis of the largest scale items number (the efficacy scale with 14 items) multiplied by ten as stipulated by Hair et al. [25].

The target population for the study consisted of all in-hospital mothers who understand French, delivered a healthy, term, and singleton infant receiving normal newborn care, initiated breastfeeding during hospitalization, have agreed to participate in the study for 2 months after the baby' s birth and have a phone number for the follow-up until 2 months.

Mothers were excluded if they had a factor that could significantly interfere with breastfeeding, such as an infant in the Intensive Unit Care, or high risk pregnancy.

2.3 Data Collection

After receiving permission from the author [26] to use the French version of the BSES-SF in this study, and also having both a written authorization from the director of the maternity unit and an oral permission from the nursing officer, the process of data collection had begun. Recruitment was conducted, during a month, from Monday to Saturday.

Mothers who agreed to participate in this study, responded to a self-administrated questionnaire gathering socio-demographic variables, a variable related to the intra-partum experience that is the type of delivery, variables related to the mother and breastfeeding including parity, previous breastfeeding experiences, physiological challenge as well as intention to breastfeed and smoking status. In this questionnaire, we included the French version of the self-efficacy scale-Short Form. The short form of the instrument, the BSES-SF, which was developed by Dennis [18], retains only 14 of the original 33 items and has also been shown to be a reliable (Cronbach's alpha coefficient was 0.94) and a valid measure of breast-feeding self-efficacy and to predict breast-feeding initiation, duration, and exclusivity [18]. According to the authors using BSES-SF French version, the Cronbach's alpha coefficient was 0.94 [15].

The BSES-SF is made up of 14 items based on 5-point likert scale, where the mothers respond to each of the statements by checking a number from 1 to 5, whereby 1 denotes "not at all confident" and 5 denotes "very confident". All items are presented positively and begin by the idiom "I can always".

The timing of BFSE measurement varies in the literature and includes antenatal, in-hospital, and up to six months postpartum measurement [27].

This study resorted to the in-hospital timing measurement. For data collection, the women were interviewed first during hospitalization and then by telephone respectively at one week and 8 weeks postpartum to determine the mother breast feeding status.

Before distributing the questionnaire, a pre-test was performed, in the maternity unit of the University Hospital of Farhat Hached.

2.4 Definition of Outcomes Variables

Breastfeeding was defined as the receipt of any breast milk (via bottle or breast) within the past 24 hours. Duration of exclusive breastfeeding was measured using the number of exclusive breastfeeding days from birth to the time of weaning, or the time of data collection achievement (8 weeks) for mothers who had not weaned.

As health benefits of breastfeeding has been proved to be "dose-response", the 'dose' of breastfeeding requires distinguishing between exclusive breastfeeding and various combinations of breast milk and other possible nutriments like formula feeding [28]. In order to promote consistency in the definition of breastfeeding and facilitate comparison of research results, as advocated by Labbok and Krasovec [28], infant feeding status until 8 weeks is categorized into six categories including *exclusive breastfeeding* (only breast milk), *almost exclusive breastfeeding* (breast milk and other fluids but not formula, e.g., water, vitamins), *high breastfeeding* (less than one bottle of formula per day), *partial breastfeeding* (at least one bottle of formula per day), *token breastfeeding* (breast given to comfort baby not for nutrition) and *bottle-feeding* (no breast milk at all).

2.5 Data Analyses

Statistical analysis was performed using the Statistical Package for the Social Sciences Software (SPSS 18.0). Data are presented with frequencies, means and standard deviations. Chi square test and Fisher test were used to compare categorical variables. Student's t-test for independent samples and Anova test were used to compare means. A two-tailed p-value of <0.05 was considered the threshold for statistical significance.

3. RESULTS

3.1 Reliability and the Breastfeeding Self-Efficacy Scale-short Form French Version

In our study, reliability and validity of the Breastfeeding Self-Efficacy Scale-Short Form French version were examined and were acceptable.

The Cronbach's alpha which was .943 attests the internal consistency of this scale as it is higher than .8 [29].

To assess the construct validity of the BFSE-SV French version, the KMO measure of sampling adequacy (.893>.5) and the significance of Bartlett's test of sphericity (p<.001) are asserted. Moreover, the loadings of each item (>.5) as well as their corresponding communalities (>.4) were acceptable [25]. The resulting factor solution accounts as well for 58.862% of total variance.

3.2 The Characteristics of the Population Study

The majority of the participants (60.7%) were aged less than 31 years old. The surveyed women consisted of 48% primiparous. The majority of the study sample had planned to breastfeed for more than 12 months (42%). The characteristics of our population study are represented in Table 1.

3.3 Breastfeeding Outcomes at 1 Week and 8 Weeks Postpartum

The proportions of mothers who exclusively breastfed were 66.7% and 7.3% respectively at 1 and 8 weeks postpartum. The reasons indicated by mothers for change in infant feeding method at 1 week and 8 weeks postpartum are presented in Table 2.

3.4 Factors Affecting the Exclusive Breastfeeding at 8 Weeks Postpartum and the In-hospital Breastfeeding Self-efficacy Score

Exclusive breastfeeding at 8 weeks was significantly associated with maternal employment status (Table 3).

Significant relationships between BSES-SF scores and mothers' age, maternal education and intention to breastfeed were found. The mean scores were determined as being significantly higher for mothers who indicated having a "good" previous breastfeeding experience and who had a vaginal delivery. The mean score of breastfeeding self-efficacy was significantly higher among mothers who still exclusively breastfed at 8 weeks postpartum compared to mothers who partially breastfed or interrupted breastfeeding at 8 weeks postpartum (Table 4).

Table 1. Characteristics of the population study

		Number (n)	Percentage (%)
Mothers age	< 20 years old	11	7.3
	[21-30 years old]	80	53.3
	≥ 31 years old	59	39.3
Maternal education	Primary school	12	8.0
	Secondary school	58	38.7
	University	80	53.3
Employment status	Student	12	8.0
	Employee	77	51.3
	Unemployed	66	40.7
Marital status	Married	146	97.3
	Single mother	4	2.7
Parity	Primiparous	72	48.0
	Multiparous	78	42.0
Smoking	Current smoker	2	1.3
	Former smoker	8	5.3
	Non smoker	140	93.3
Intention to breastfeed	< 6 months	31	20.7
	Between 6 and 12 months	56	37.3
	≥ 12 months	63	42.0
Mode of delivery	Vaginal	41	27.3
	Cesarean	109	72.7
Previous breast feeding experience (n=78)	Yes	73	93.6
	No	5	6.4
Previous breastfeeding experience (n=78)	Judged as “good”	63	80.8
	Judged as “bad”	15	19.2
Mode of infant feeding at 8 weeks	Exclusive breastfeeding	11	7.3
	Almost exclusive breastfeeding	54	36.0
	High breastfeeding	30	20.0
	Partial breastfeeding	19	12.7
	Bottle feeding	36	24.0

Table 2. Reasons for change in infant feeding method at 1 week and 8 weeks postpartum

Infant feeding status	At 1 week postpartum n (%)	At 8 weeks postpartum n (%)
Insufficient milk supply	5 (6.5)	57 (33.5)
Water is vital for babies	29 (37.7)	45 (26.5)
Herbal tea is very useful to treat baby’s bloated stomach	15 (19.4)	25 (14.7)
Breast milk is not sufficient for babies growth	12 (15.6)	9 (5.3)
Physical challenge	16 (20.8)	7 (4.1)
Easy when go out	0 (0.0)	4 (2.4)
Return to work	0 (0.0)	23 (13.5)

4. DISCUSSION

Tunisia is a country of 11 million inhabitants situated on the Mediterranean coast of North Africa. Arabic is the official language of the country. French is a spoken commercial and educational language commonly used in Tunisia. Our study was conducted among women delivering in the maternity unit of the public University hospital of Farhat Hached. This hospital is situated in Sousse Governorate which is one of the twenty-four governorates (provinces) of Tunisia. It is beside the eastern coast of Tunisia in the north-east of the country and has a population of 674,971 according to the national census of 2014. It is a heterogeneous city area known for its social, economic, and cultural diversity. It is also a major obstetrical referral center for physicians, and recorded about 10179 deliveries in 2013 and 10576 in 2014 with

high number of deliveries occurred between June and august (respectively 917, 950, and 1000 deliveries in 2014).

In our study, we used the French version of the Breastfeeding Self-Efficacy Scale-Short Form. No Arabic version was available in the literature. For this reason understanding French was among the inclusion criteria of our population study.

In our study, the BFSE-SF had an acceptable reliability. This result is consistent with the original research which provides evidence that the BSES-SF is reliable but also evaluates maternal breastfeeding self-efficacy across the postpartum period [18].

In our study, at 1 week post-partum, 66% of mothers were breastfeeding exclusively. At 8 weeks postpartum, an important decline in rates of exclusive breastfeeding was recorded (7.3%). This rate was deeply below what is recommended by the World Health Organization [30], which is exclusive breastfeeding for at least 50% of children under six months age. Nevertheless, compared to a study conducted in the region of Monastir in Tunisia [9], the rate of exclusive breastfeeding at 8 weeks was approximately twice over (15.1%). The reason commonly mentioned by mothers for supplementing (high or partial breastfeeding) or even for substituting (bottle-feeding) with formula milk was perceived insufficient milk supply. This noteworthy finding was corroborated by several findings [9,20,31]. Most often, this cause was associated with premature breastfeeding cessation that occurred between 2 and 6 weeks [32].

In the exception of the maternal employment status, in this cohort of mothers, demographic variables were not significantly linked to breastfeeding outcomes. However, in the literature, it has been consistently revealed that socio-demographic factors are associated with breastfeeding behavior [33-35].

Table 3. Factors associated with exclusive breastfeeding at 8 weeks

		Exclusive breastfeeding at 8 weeks		*p*
		Yes n (%)	**No n (%)**	
Mothers age	< 20 years old	0 (0.0)	11 (100.0)	
	[21-30 years old]	4 (5.0)	76 (95.0)	.35
	≥ 31 years old	7 (11.9)	52 (88.1)	
Maternal education	Primary school	0 (0.0)	12 (100)	
	Secondary school	4 (6.9)	54 (93.1)	.92
	University	7 (8.8)	73 (91.3)	
Employment status	Student	7 (58.3)	5 (41.7)	
	Employee	4 (5.2)	73 (94.8)	$<10^{-3}$
	Unemployed	0 (0.0)	61 (100)	
Marital status	Married	11 (7.5)	135 (92.5)	.99
	Single mother	0 (0.0)	4 (100.0)	
Smoking status	Current smoker	0 (0.0)	2 (100.0)	
	Former smoker	0 (0.0)	8 (100.0)	.99
	Non smoker	11 (7.9)	129 (92.1)	
Parity	Primiparous	4 (5.6)	68 (94.4)	.42
	Multiparous	7 (9.0)	71 (91.0)	
Intention to breastfeed	< 6 months	0 (0.0)	31 (100.0)	
	Between 6 and 12 months	0 (0.0)	56 (100.0)	.99
	≥ 12 months	11 (7.5)	52 (82.5)	
Mode of delivery	Vaginal	7 (6.4)	102 (93.6)	.49
	Cesarean	4 (9.8)	37 (90.2)	
Previous breast feeding experience	Yes	7 (9.6)	66 (90.4)	.30
	No	4 (5.2)	73 (94.8)	
Previous breastfeeding experience	Judged as “good”	7 (11.1)	56 (88.9)	.33
	Judged as “bad”	0 (0.0)	15 (100.0)	

Table 4. Significant differences in the in-hospital BSES-SF by variables

		BSES-SF Mean ± SD	df	Test value	*p*
Mothers age	< 20 years old	37.72 ±7.71	2	F = 6.01	.003
	[21-30 years old]	50.41 ± 11.42			
	≥ 31 years old	48.89 ± 11.79			
Maternal education	Primary school	57.83 ± 6.91	2	F = 3.96	.02
	Secondary school	47.81 ± 11.03			
	University	48.32 ± 12.35			
Employment status	Student	55.58 ± 15.03	2	F = 2.54	.08
	Employee	47.53 ± 11.83			
	Unemployed	49.27 ± 10.59			
Marital status	Married	48.93 ± 11.78	148	t = -.33	.76
	Single mothers	47.00 ± 11.54			
Smoking status	Current smoker	30.00 ± 0.00	2	F = 2.74	.068
	Former smoker	47.75 ± 11.54			
	Non smoker	49.22 ± 11.65			
Parity	Primiparous	48.23 ± 12.05	76	t = -1.26	.20
	Multiparous	49.48 ± 11.50			
Intention to breastfeed	< 6 months	40.19 ± 12.73	2	F = 41.39	$<10^{-3}$
	Between 6 and 12 months	44.66 ± 10.08			
	≥ 12 months	56.92 ± 6.59			
Mode of delivery	Vaginal	51.19 ± 10.43	60.67	t = -3.74	$<10^{-3}$
	Cesarean	42.75 ± 12.92			
Previous breast feeding experience	Yes	49.91 ± 11.20	148	t =-.65	.51
	No	43.20 ± 15.33			
Previous breastfeeding experience	Judged as “good”	52.74 ± 10.25	63.42	t = -10.52	$<10^{-3}$
	Judged as “bad”	35.80 ± 3.72			
Exclusive breastfeeding at 8 weeks	Yes	64.90 ± 4.50	21.53	t = -10.36	$<10^{-3}$
	No	47.61 ± 11.19			
Mode of infant feeding at 8 weeks	Exclusive breastfeeding	64.90 ± 4.54	4	F = 87.75	$<10^{-3}$
	Almost exclusive breastfeeding	55.66 ± 5.05			
	High breastfeeding	53.40 ± 5.64			
	Partial breastfeeding	39.68 ± 11.59			
	Bottle feeding	34.91 ± 5.61			

Abbreviations: df: degree of freedom, t: student’s test, F: Fisher test

Several studies have established a positive relationship between marital status and breastfeeding outcomes and suggested that married women tend to breastfeed longer than single ones [33,36].

High mothers’ educational levels have been consistently associated with longer breastfeeding duration in developed countries [18,34], whereas in developing countries, a negative association has been reported [37]. A high family income has been shown to be significantly associated to breastfeeding outcomes [35,38].

In reference to age, it has been indicated that older mothers [20,34,39-41] are more likely to breastfeed for a longer period than younger ones.

Additionally, many studies reported that maternal employment is likely to influence breastfeeding duration as well as the level of breastfeeding [42]. In fact, Raisler et al. [43] indicated that low-income Black mothers had reported that returning to work made breastfeeding very difficult and that the majority weaned the infant before returning to employment. McCarter-

Spaulding et al. [42] found that in addition to breastfeeding self-efficacy, the timing of returning to work predicted the duration of breastfeeding. That is, returning to work before 12 weeks postpartum significantly increased the risk of weaning compared to women who continued to be at home.

Other factors could also affect breastfeeding practices such as parity and type of delivery. In this cohort of mothers, no significant associations between breastfeeding outcomes and parity and type of delivery were found.

In the literature, association of delivery mode with breastfeeding level and duration is contradictory [34,44-46]. Shawky et al. [44] have reported that infants born by caesarean section tended to stop breast feeding earlier than those born vaginally. According to Prior et al. [45], once breastfeeding has initiated, an absence of any association has been outlined. Li et al. [46] have nonetheless found that women who had delivered by cesarean section in Australia were more likely to breastfeed for longer periods.

In consistence with our findings, breastfeeding was not associated to parity among Tunisian mothers [9] as well as Australian women [34]. However, a significant association has been reported by others researchers [47,48].

Numerous studies have focused on the relationship between smoking status and breastfeeding duration. No significant association between smoking status and breastfeeding duration has been depicted in our study. However negative association has been found in several studies [49-51].

In our study mothers who still exclusively breastfed at 8 weeks were more likely to indicate that they intended to breastfeed than those who wean exclusive breastfeeding but without a significant difference. Intended breastfeeding duration has been found frequently to be positively associated with breastfeeding duration [20,34,52].

Non-modifiable variables such us sociodemographic factors offer little help to health care professionals in providing useful solutions to enhance breastfeeding outcomes [19]. Compared to other variables, it has been demonstrated that self-efficacy is a prominent variable predicting breastfeeding outcomes [20] and in an attempt to improve the mother's perception of breastfeeding self efficacy. Hence, variables affecting this modifiable variable should be identified.

Consistent with the vast literature, there was a statistically significant relationship between self-efficacy scores and the breastfeeding continuation [13,14,19,42,51,53,54]. Thus, low breastfeeding self-efficacy is correlated to bottle-feeding whereas high breastfeeding self-efficacy is related to exclusive breastfeeding.

In our study, the breastfeeding self-efficacy score was significantly associated to mothers' age, maternal education, intention to breastfeed, previous breastfeeding experience and the delivery mode.

Interestingly, breastfeeding self-efficacy corresponds to a potential modifiable factor that impact both breastfeeding duration and exclusivity and consequently can be enhanced through nurse's interventions. Founded on the four general sources of self-efficacy proposed by Bandura [14] and tailored to the behavioral realm of breast-feeding by Dennis [16] including performance accomplishments, vicarious experiences, verbal persuasion, and psychological and affective states, nurses can effectively design intervention and strategies with the goal to enhance breastfeeding self-efficacy and thus promote longer durations and more exclusive patterns of breastfeeding.

Our study has some limitations and the major one is the mode of participants' recruitment. First, it was a convenience sample and not randomly selected. In addition, participants were selected from a single center rather than multiple centers. Moreover selected participants were only those who had phone number and were able to understand French since the administered questionnaire was containing the French version of the BSES-SF was in French. Therefore generalizability of this study is limited.

5. CONCLUSION

Through this study we intended to identify factors affecting the breastfeeding self-efficacy and those associated with an exclusive breastfeeding at 8 weeks. That is, women at risk for prematurely breastfeeding cessation need to be targeted by health care providers for support and counselling during their pregnancy to enhance their self-efficacy for initiating and sustaining breastfeeding.

A replication of this study with a larger and more heterogeneous sample is recommended and may determine other variables related to breastfeeding outcomes. The translation of the original version of this useful tool, Breastfeeding Self-Efficacy Scale-Short Form, into Arabic language is required, and may be more beneficial for health professionals to target easily Tunisian mothers. Following mothers to the 6 months, minimum recommendation for breastfeeding, is warranted in order to achieve more precise breastfeeding duration rate.

A new perspective for breastfeeding promotion focusing on major modifiable factors, mainly breastfeeding self-efficacy, is advocated to enhance breastfeeding duration and exclusivity rates in Tunisia.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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