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FOOD CHOICE AND BEHAVIOUR IN INDONESIA:
FROM UNDER- TO OVER- NUTRITION**



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Contents

Invited Editorial	Sv
Guest Editor <i>Dr Jane Willcox, La Trobe University, Victoria, Australia</i>	
Dietary diversity beliefs and practices among working mothers in Jakarta: a qualitative study <i>Aria Kekalih, Judhiastuty Februhartanty, Muchtaruddin Mansyur & Anuraj Shankar</i>	S1
Comparing intake adequacy and dietary diversity between adolescent schoolgirls with normal nutritional status (NG) and undernutrition (UG) based on BMI-for-age (BAZ) living in urban slums in Central Jakarta <i>Rika Rachmalina, Helda Khusun, Luluk Basri Salim, Luh Ade Ari Wiradnyani & Drupadi HS Dillon</i>	S19
Food purchasing behaviour among urban slum women in East Jakarta: a qualitative study <i>Dian Sufyan, Judhiastuty Februhartanty, Saptawati Bardosono, Helda Khusun, Evi Ermayani, Purnawati Hustina Rachman & Anthony Worsley</i>	S33
Exposure and approval of food marketing strategies: a mixed methods study among household food providers in Jakarta <i>Selma Avianty, Helda Khusun, Saptawati Bardosono, Judhiastuty Februhartanty & Anthony Worsley</i>	S47
Association between food marketing exposure and consumption of confectioneries among pre-school children in Jakarta <i>Maria Meilan Y Fernandez, Judhiastuty Februhartanty & Saptawati Bardosono</i>	S63
Eating behaviour of young female workers with low socioeconomic status in Malang City, East Java: a qualitative study <i>Intan Yusuf Habibie, Inge Brouwer & Judhiastuty Februhartanty</i>	S75
Eating behaviour of adolescent schoolgirls in Malang, East Java: a qualitative study <i>Mulia Sondari, Inge Brouwer & Judhiastuty Februhartanty</i>	S87

Perceptions of the causes of obesity among normal weight, overweight and obese Indonesian women: a mixed methods approach	S97
<i>Ismi Irfiyanti Fachruddin, Judhiastuty Februhartanty, Saptawati Bardosono, Helda Khusun & Anthony Worsley</i>	
A qualitative study comparing the coping strategies between food secure and food insecure households of Kaluppini indigenous people in South Sulawesi	S111
<i>Nurbaya, Aria Kekalih & Judhiastuty Februhartanty</i>	
Early development process of drama and storytelling scripts as media for nutrition education on balanced diets among elementary school children	S123
<i>Suci Destriatania, Fenny Etrawati & Judhiastuty Februhartanty</i>	
Acknowledgements	S139

Invited Editorial

Indonesian nutrition research: A varied and active area of scholarship

Dedicating the current journal supplement to Indonesian nutrition research illustrates the emerging liveliness of nutrition focused interest and scholarship in the region. Indonesia, like other low – middle income countries is immersed in a nutrition transition, reflected by changes in the diversification and health of dietary patterns across populations (Lipoeto *et al.*, 2004; Popkin, 2006a). In developing countries this transition is driven by economic development, urbanisation and globalisation, along with changes to the food supply and the increasing dominance of multinational food companies (Moodie *et al.*, 2013; Popkin, 2002, 2006b). The double burden of malnutrition sees increasing symptoms of overnutrition, obesity and non-communicable diseases, occurring alongside the prevailing symptoms of undernutrition, protein-energy malnutrition and micronutrient deficiencies (Popkin, 2006a). This transition, and the subsequent consequences, pose new population health challenges for policy makers. Thoughtful research is required to direct public health policy and interventions to tackle the consequences of nutrition transition. Indonesian scientists face many challenges to research and international publication (Teixeira da Silva & Winarto, 2013) and more opportunities for them to inform the body of nutrition transition work are required and welcome.

The papers in this special issue highlight many of the health and nutritional issues facing at-risk populations in Indonesia, including indigenous and rural populations and the urban poor. Consistent with the nutrition transition in which Indonesia finds itself, there are studies that examine food insecurity and undernutrition and those that focus on obesity. The nutrition topics range from food purchasing and dietary practices to approval of food marketing to integrating nutrition messages into educational storytelling. The inclusion of a number of papers utilising qualitative methodology allows a deeper dive into recording communities attitudes and behaviours. The results should be welcomed by policy makers providing pointers for targeted preventive approaches in at-risk communities.

Low-income and indigenous communities commonly shoulder a major burden of malnutrition (Müller & Krawinkel, 2005; Toyama *et al.*, 2001). Understanding how resilient individuals and communities cope and manage food insecurity is crucial to allow policy makers to reinforce and encourage strategies to mitigate malnutrition (Davies, 2016). In this issue, Nurbaya and colleagues qualitatively compare the coping tactics of food secure and insecure households with young children of the Kaluppini indigenous people in South Sulawesi (Nurbaya, Kekalih & Februhartanty, 2019). Both food secure and insecure households reported making dietary changes, such as reducing consumption or substituting foods, borrowing food or money, and engaging in traditional coping strategies, such as food sharing. A difference highlighted between the two groups was the capacity for members of the food secure households to travel outside the village to other islands or internationally to generate income. While signifying an adaptable livelihood, the loss of family members to outside work has family and community repercussions. The authors identify the need for appropriate food and agriculture programmes such as home gardens. Importantly,

more work is required to develop cultural stability and adaptive capacity to allow communities to respond to the variability of food supply.

In a different community, the food purchasing behaviour of women dwelling in urban slums in East Jakarta was investigated by Sufyan and colleagues (2019). Paralleling the previous study, women's food acquisition was influenced by multiple environmental factors. These included food accessibility and convenience, family pressures, time availability, cost efficiency, and food store marketing tactics. The researchers found that most women, who were responsible for their family food provision, purchased ready-to-eat foods rather than cooking them at home, for either their family or themselves. These energy-dense, nutrient-poor meals, available at the local store, were signalled by the researchers as potential contributors to obesity. The vulnerability of urban slum dwellers to restricted dietary diversity, including more convenience and less whole foods, is supported by others' work in urban slums. Kimani-Murage and colleagues (2014) noted that complex nature of chronic poverty and the high levels of food insecurity in urban slum settings in Nairobi, Kenya, often engendered the use of coping strategies that negatively impacted on health. Sufyan and colleagues (2019) provide a detailed account of food acquisition within the context of an urban slum setting and highlights the complex web of factors contributing to nutrition related health. Broad community, academic and policy player engagement will be required to transform the local and international evidence and experience into sustainable action at the local level.

Food marketing and communication in low-middle income countries is influential in food purchasing and consumption (Hastings *et al.*, 2003). This marketing influences consumers to purchase more highly processed energy-dense, low-nutrient food (Hastings *et al.*, 2003) and has had significant impact in areas such as breast milk substitutes (Vinje *et al.*, 2017). The theme of food marketing is seen in two of the studies in this issue (Avianty *et al.*, 2019; Fernandez, Februhartanty & Bardosono, 2019) and emerges in other research on the influences on food choice, consumption and obesity. The debate about ways to restrict food marketing continues to rage internationally with a specific focus on advertising of unhealthy food to children (Matthews, 2007). In this issue, Avianty and colleagues (2019) report that the majority of Indonesian primary household food providers (n=279) did not approve of the marketing of "fast" foods and those high in sugar. Importantly, more than 60% of participants disapproved of in-school vending machines stocked with these foods as well as the advertising of them on television and radio. This is consistent with consumer and public interest groups in other countries who support food marketing restrictions (Matthews, 2007). However, in Avianty *et al.*'s study while participants supported the advertising of fruit, vegetables and water, they were more ambivalent about marketing in schools. Concerningly, more than half (64.5%) approved of food companies selling high sugar and "fast" foods providing nutrition education in schools or on television. Schools provide a strong channel for food companies through their sponsorship of school events, provision of educational or sporting equipment and stocking nutrient poor foods and drinks in canteens and vending machines. While the reduction of food marketing exposure is undoubtedly required as part of an overall strategy to improve nutrition for children, Indonesian policy makers will be challenged by the influence of the powerful multinational food companies. The research also suggests a need for government measures to counteract negative marketing in order to swing the ambivalent consumers towards health.

The challenges of nutrition transition are exceedingly varied and complex, as are the health policies and programmes required to moderate its negative health and community impacts. The studies in this issue contribute to the field and provide a rich story of the role nutrition within different community contexts. In order to reduce the negative health impacts of nutrition transition, strong and evolving endeavours are required in health and nutrition policy and promotion. Each research paper in this issue provides pointers for potential solutions and could contribute to a road map for policy makers.

We are indebted to Professor Khor, all the reviewers and the technical team of the Malaysian Journal of Nutrition, for working with Indonesian researchers to grow the voice for Indonesian nutrition.

Jane Willcox PhD

Guest Editor

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Dietary diversity beliefs and practices among working mothers in Jakarta: a qualitative study

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ABSTRACT

Introduction: Dietary diversity is a global challenge in complementary feeding. Despite more women joining the workforce in developing countries, there are limited studies on the beliefs of working mothers and their experiences in relation to the provision of dietary diversity as recommended by the World Health Organization. **Methods:** This qualitative study explored the behavioural, normative and control beliefs of working mothers on dietary diversity practices, based on the Theory of Planned Behaviour (TPB). A total of 25 mothers of different occupational levels were recruited from workplaces in Jakarta. **Results:** Working mothers at the lower occupational levels showed a lack of understanding of the importance of dietary diversity and reported poor practices. These included the late introduction of animal protein as a food source, and few types of feeding instant foods. Due to their limited knowledge of nutrition, these working mothers tended to accept poor dietary diversity practices as normal. **Conclusion:** Working mothers at the lower occupational levels practised poor dietary diversity owing to work-related factors. Efforts should be undertaken to provide correct nutritional information related to complementary feeding at workplaces, especially to working mothers in the unskilled occupations.

Keywords: Child-feeding, working mothers, unskilled labour, qualitative study, Indonesia, dietary diversity

INTRODUCTION

Dietary diversity has been described as the number of different food groups consumed over a given reference period (Ruel, 2003). It is an important indicator of infant and young child feeding (IYCF) practices for children aged 6-24 months (WHO, 2008). Dietary diversity has

been reported to be associated with height-for-age z-scores (HAZ) of young children in developing countries (Chua *et al.*, 2012; Jones *et al.*, 2014). Poor dietary diversity in complementary feeding practice can lead to deficiencies of essential micronutrients, which may lead to impaired immune systems and

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permanent adverse effects on the growth and development of children (Henjum *et al.*, 2015).

According to the World Health Organization (WHO) (2008), complementary feeding may be assessed using the five following indicators: (1) the introduction of solid, semi-solid or soft foods; (2) minimum dietary diversity; (3) minimum meal frequency; (4) minimum acceptable diet and (5) the consumption of iron-rich or iron-fortified foods. Complementary feeding that consists of less than four food groups and the delayed introduction of food variety, especially foods containing animal protein, are some of the significant problems in achieving dietary diversity (Menon, 2012; Zahiruddin *et al.*, 2016).

Most working women are in the reproductive age group (Grzywacz *et al.*, 2010; Singh & Hoge, 2010). The number of women joining the workforce has been on the increase, but this has been mainly at the lower skilled and unskilled levels (ILO, 2006; Cohany & Sok, 2007). This phenomenon is also found in Indonesia. The employment-to-population ratio (EPR) that indicates the percentage of people in employment from the total working age population has increased in female workers by > 5.0% in the last decade, in Indonesia, and is much higher than that for male workers. However, only 0.5% of working women were in leadership and management roles in Indonesia, compared to 1.6% for men (ILO, 2017), indicating that most women are employed in the lower levels of occupation, as unskilled labourers and informal workers. Working women face several challenges in trying to adhere to optimal practices for feeding infants and young children. They were unlikely to follow the recommended practise of exclusive breastfeeding until the child was 6 months and then begin sustained, complementary breastfeeding

until the child was 2 years of age (Ong *et al.*, 2005; Baker & Milligan, 2008; Gennetian *et al.*, 2010).

Many working women often do not have sufficient resources in their families or at the workplace for child-care support (Toyama *et al.*, 2001; Du & Dong, 2010; Roshita, Schubert & Whittaker, 2012). The dietary diversity of young children may be affected, either positively through increased economic capacity of the mother to buy a wider variety of foods, or negatively as a result of the reduced time that working mothers have to prepare a variety of foods (Priebe, 2010; Razavi, 2012). This situation underlines the importance of understanding the beliefs and practices of working mothers regarding the provision of optimal dietary diversity.

Studies in developing countries have revealed poor dietary diversity practices among working mothers, although the evidence for this is contradictory in the middle- and high-income countries (Dewey & Adu-Afarwuah, 2008; Faber, Laubscher & Berti, 2014). There are few studies done in developing countries that have investigated dietary diversity challenges among working mothers in lower occupational levels (Vereecken & Maes, 2010; Razavi, 2012). Studies in Southeast Asian countries found poor dietary diversity practices among children aged 6–24 months (Batal, Boulghourjian & Akik, 2010; Senarath *et al.*, 2012).

The aim of this study was to explore dietary diversity practices and its related beliefs among working mothers in Jakarta, Indonesia, as a basis for designing interventions to promote appropriate complementary feeding for working mothers. This qualitative study was undertaken based on the Theory of Planned Behaviour (TPB) to explore the behavioural, normative and control beliefs to dietary diversity practices

among mothers working at different occupation levels (Ajzen & Manstead, 2007).

MATERIALS AND METHODS

Theoretical framework

The TPB model is widely used in the design of behavioural change interventions. The TPB model stipulates that three sets of beliefs mediate behavioural intentions, namely (i) behavioural beliefs, e.g. working mothers' attitudes based on perceived benefits and problems in practicing dietary diversity; (ii) control beliefs, namely perceptions related to control over necessary resources, e.g. capacity to cook and process the food, child-care resources when mother is working, and support to engage in dietary diversity practices; and (iii) normative beliefs e.g. subjective norms determined by perceptions of the views of other working mothers on complementary feeding (Ajzen & Manstead, 2007; Weir *et al.*, 2010).

Recruitment of participants

The International Labour Organization (ILO) categorises occupations into the following broad groups or levels (i) lowest level, unskilled labour; (ii) medium level, skilled labour and (iii) highest level, professional (ILO, 2006; Cohany & Sok, 2007; Vereecken & Maes, 2010). The study was conducted in Jakarta, which was chosen as it was a key urban location, with working mothers employed in different categories of occupations.

Working mothers with at least one child aged 6-23 months of age were recruited from these workplaces. A garment manufacturing factory was selected for the unskilled labour participants, and chemical and food factories for skilled and professional level workers. The participants at highest level were those who worked as managers and professionals, while

the medium level or skilled labour were technicians, clerks, and service workers, and those at the lowest level were unskilled labourers. Non-working mothers were also included as a fourth group. They were recruited from among the wives of male workers in the study workplaces as it was convenient to do so.

The present study targeted to recruit a minimum number of 24 subjects for the four groups, based on the recommendations of having 6-10 participants per group to reach saturation (Tashakkori & Teddlie, 2003). A final total of 25 participants were recruited, comprising six working mothers representing unskilled labour, seven representing skilled labour, six professional managers and six non-working mothers. We also visited two houses in each group to interview caregivers (three grandmothers and five babysitters) and families (four husbands), and to observe the child's activities. Three workplace supervisors from each employment group, and two officers from the Mother and Child Health Directorate, Ministry of Health, were also interviewed about policy and health education facility in the workplace.

WHO indicator on dietary diversity

The WHO Minimum Dietary Diversity indicator states that children who are 6-23 months of age should receive foods from four or more out of seven food groups besides breastmilk. The seven food groups are listed as follows: (1) staples, (2) vitamin A-fruits/vegetables, (3) other fruits and vegetables, (4) animal-source protein (meat/poultry/fish), (5) milk and milk-related products, (6) plant source protein (legumes) and (7) eggs. The introduction of dietary diversity is recommended from 6 months of age, as breastmilk alone will by then no longer be sufficient to provide the child's nutrient requirements (Jones *et*

Table 1. Information explored in the qualitative study

<i>Information</i>	<i>Function in the behavioural model</i>	<i>Source</i>	<i>Participatory techniques[†]</i>
1. Value of maintaining child nutrition among working mothers	Behavioural belief	Working mother peer	None
2. Value of dietary diversity importance in child feeding	Behavioural belief	Working mother peer	Activities 1 and 2
3. Knowledge of dietary diversity and timing of giving different types of food	Skill and abilities	Working mother peer	Activities 1 and 2
4. Value of parenting and child feeding among peers of working mothers	Normative belief	Working mother peer	Activity 4
5. Perspective on difficulties in complementary feeding practices	Self-Efficacy/Control Belief	Working mother peer	Activity 3
6. Extent of dependency on family and child caregiver for child care	Control Belief	Father or caregiver	Activity 4
7. Facilitation and support from employer related to child care and feeding practices (not only exclusive breastfeeding)	Environmental constraint	Employer/ workplace supervisor and Ministry of Health (MoH) officer	Activity 4
8. Perspective on effect of working on child feeding and dietary diversity	Outcome evaluation	Working mother peer, father or caregiver	None
9. Perspective on effect of child feeding on child nutrition status			

al., 2014). Infants can be fed pureed, mashed and semi-solid foods prepared from infant cereals, vegetables, fruits, meat, and other protein-rich foods (Abeshu, Lelisa & Geleta, 2016). The participating women were questioned on the food groups given to their child on the previous day.

In-depth interview

The health belief model adopted from the TPB (Ajzen & Manstead, 2007) provides a useful framework to identify the determinants of feeding practice. These consist of three primary aspects: (i) attitude or behavioural beliefs, (ii)

perceived norms concerning performance of the behaviour (normative beliefs, environmental constraints), and (iii) self-efficacy with respect to performing the behaviour (skills, abilities and control beliefs) (Fishbein, Von Haefen & Appleyard, 2001). The questions were targeted at working mothers and verified with caregivers, other family members and employers.

Card-sorting for exploring dietary diversity practice

The researchers also used a participatory technique, namely card-sorting, to stimulate discussions arising from

the responses of mothers on their perspectives and the problems they faced in achieving dietary diversity practices, as well as their contacts with whom they discussed feeding problems. (Neufeld *et al.*, 2004). Card-sorting consisted of four types of activities that were designed to investigate (i) the knowledge of mothers on the introduction of foods to infants, (ii) the timeline of dietary diversity practices, (iii) the problems in implementing complementary feeding practices, and (iv) contacts and channels they sought to obtain information on child feeding problems. The card-sorting activities were designed by the research team, reviewed by two nutrition experts and pretested among five volunteers with similar characteristics as the participants (Kerr, Hilari & Litosseliti, 2010).

Based on a list of food groups prepared by two nutrition experts and another list of commonly consumed

foods by children <2 years old (Ferguson *et al.*, 2006), a final list comprising a total of 17 food groups was developed for the qualitative study. These are staples (rice porridge, filtered porridge, soft rice, instant porridge, potatoes and mung bean porridge), plant protein sources [*tempeh* (fermented soybean) and tofu, both from soy], animal protein sources (chicken, chicken liver, fish, egg and meat), vegetables, fruits and beverages (formula milk and sweetened tea). Filtered porridge is rice porridge with finer texture after being filtered while soft rice is Indonesian steam chicken rice or *nasi tim*.

An A3 sheet paper with an age timeline from 0 month to 1.5 years was provided to the mothers. In line with each activity, the mothers used sticky cards to paste pictures of the foods that they had fed to their child according to the age timeline. An example of a card-sorting sheet is shown in Figure 1.

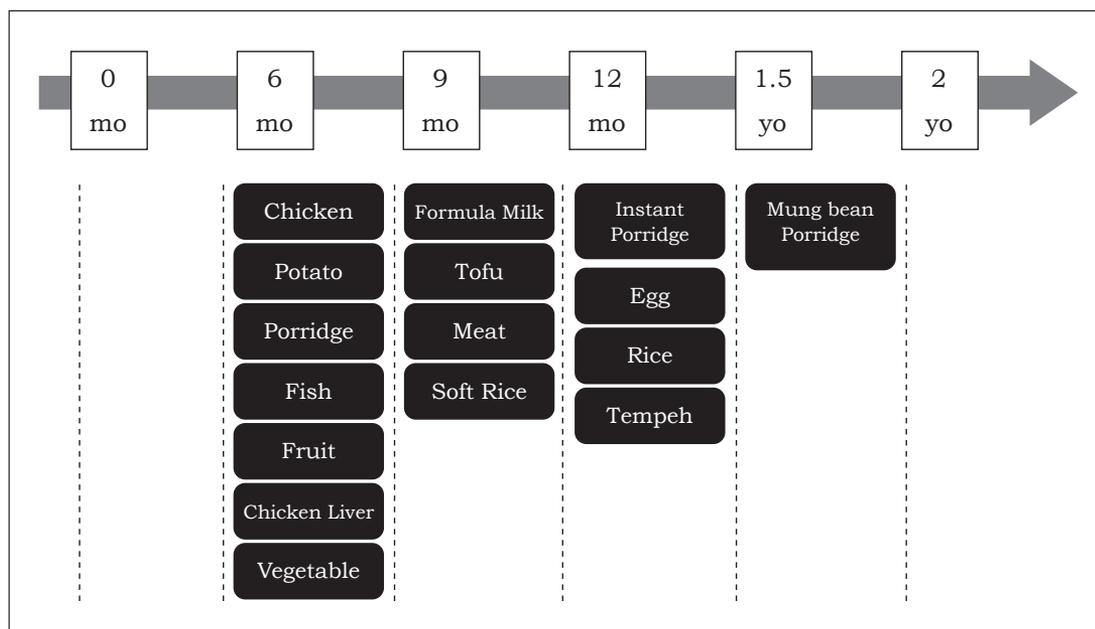


Figure 1. Example of dietary diversity card-sorting sheet. Each sticky note describes different foods that the mother can attach to a specific age of the child (e.g. chicken must be introduced at 6 month old of child age, while mung bean porridge was introduced at 1.5 years old of child age)

Using this card sorting instrument, we could observe how many food groups were given according to the child's age, based on mother's knowledge and experience (Activity 1 and Activity 2). Following this, we explored their related beliefs underlying their dietary diversity practices.

Activity 3 was aimed at assessing problems and challenges experienced by the mothers in providing complementary feeding. Problems were listed based on discussion with the nutrition experts and pretested before including them on the sticky cards (Menon, 2012; Senarath *et al.*, 2012). We asked the mothers to stick the cards in the order from the most to the least troubling.

Activity 4 was aimed at assessing the priority that mothers assigned to the persons with whom they mostly shared information on child-feeding. This is a part of the subjective norms in the Health Belief Model. Three groups, namely, family members, health workers, and other working mothers were on a prepared list from which the participants were requested to select from.

Before data collection, two interviewers were trained so that they had an adequate understanding of the instruments used. All card-sorting activities were audio recorded, its results were photographed. The analysis was conducted based on recorded interviews transcribed in verbatim and from the photographs of the card-sorting activities.

Data collection

Data were collected from August to October 2014 using in-depth interviews of both working and non-working mothers. In-depth interviews were also conducted with fathers, caregivers and employers. Each session began with a brief introduction and description of the purpose of the study. Participants

were informed that there were no right or wrong answers and were encouraged to share their views regarding dietary diversity in complementary feeding. In order to obtain a better understanding and avoid bias in the interview process, the researcher conducted the interviews in the Indonesian language. The interviews lasted 45-90 minutes per session and were held in a closed room. Information from the in-depth interviews was validated via cross-checking and the findings were reconfirmed with the subjects.

Qualitative data transcription

All recordings and written notes were converted into transcripts. Two researchers with a background in nutritional education and complementary feeding research read the transcripts independently, and then coded them into descriptive words or phrases. Photographs of card sorting results were coded based on their similarities in practices and knowledge. The coded transcripts were compiled and grouped into themes. The themes that emerged were then reviewed and edited. Key issues were compiled in a matrix so that the comparison of dietary diversity feeding practices among women from different occupations could be undertaken. Saturation was considered when the researcher had reached the point of no new findings or themes. Triangulation of source, method and analysis was explored to ensure the validity of the qualitative data. Information gathered from the peers of the mothers, families and key informants was used to complement information provided by the mothers (Fusch & Ness, 2015).

Ethical considerations

The study procedures were fully approved by the Health Research Ethics Committee of the Faculty of Medicine,

Universitas Indonesia (number 155a/H2.FI/ETIK/2014).

RESULTS

Characteristics of the informants

Characteristics of the informants are shown in Table 2.

Problems in achieving dietary diversity

In general, the mothers knew that filtered porridge could be given to children who were < 9 months of age, rice porridge could be introduced at 9 months, and steamed rice at 12 months of age. Based on the in-depth interviews using card sorting, we found that the children of mothers at the lower levels of

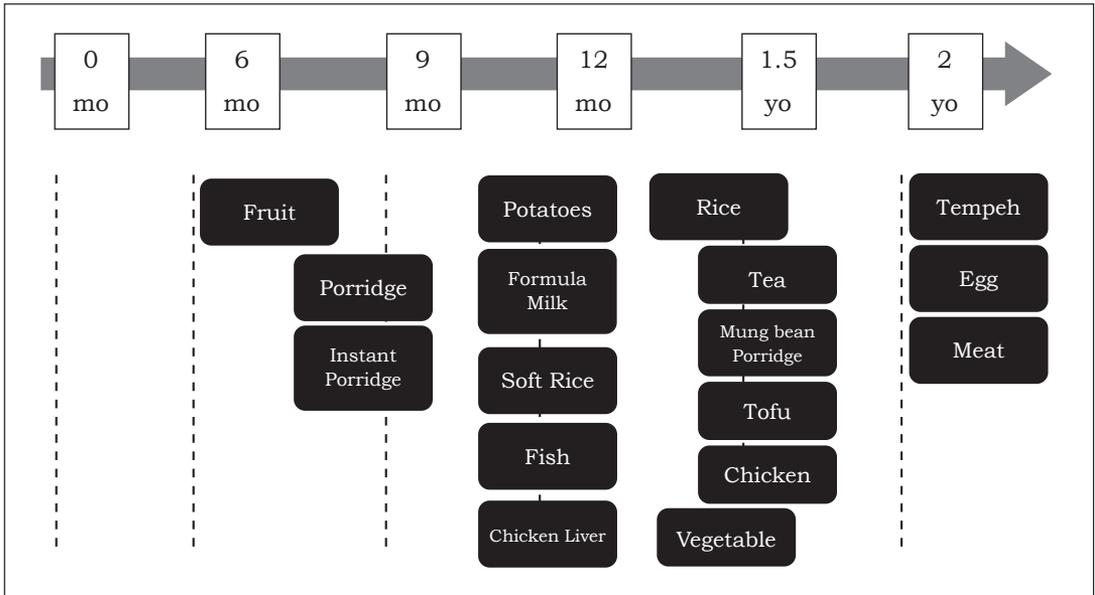
employment were introduced to the food groups at various ages. Figure 2 shows an example of mothers from unskilled and skilled labour level which indicated the late introduction of foods, compared to another from the professional level, who introduced more diverse foods in a timely manner.

In the former case, the mother only gave staples and soft fruits such as banana at age < 9 months. Animal protein food sources such as chicken, chicken liver or fish were given later when the child was 12 months old. By contrast, the mother from the professional category introduced fish, chicken liver and vegetables beginning at the age of 6 months. Quotes from a

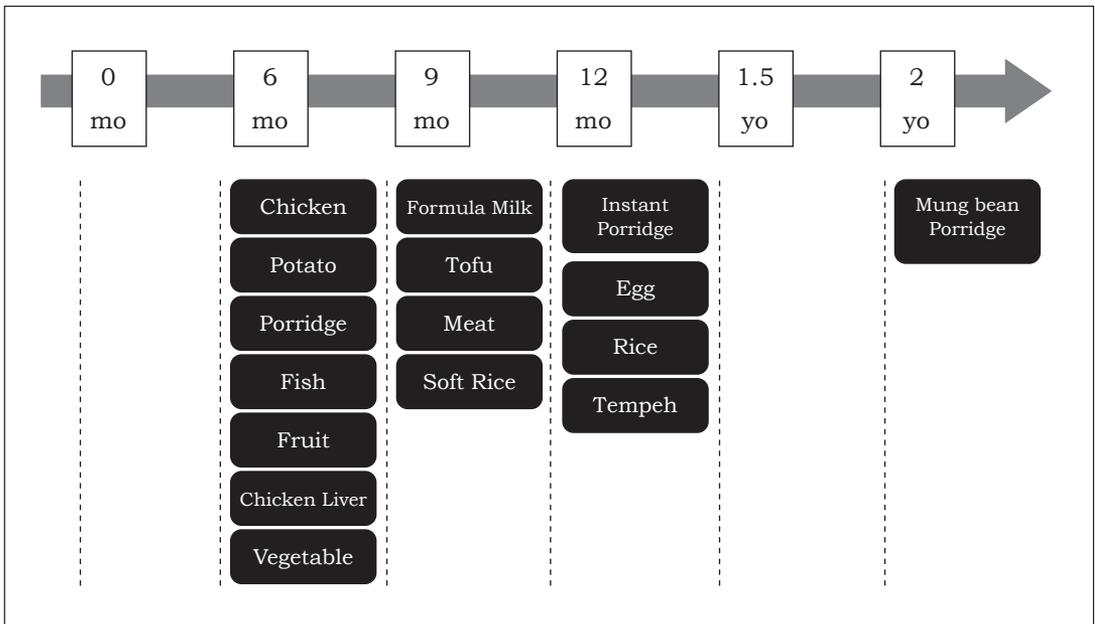
Table 2. Characteristics of the subjects: working and non-working mothers

<i>Characteristics</i>	<i>Non-working (n=6)</i>	<i>Unskilled labour (n=6)</i>	<i>Skilled labour (n=7)</i>	<i>Professional/ Manager (n=6)</i>
Child				
Age				
6–11 months	2	2	3	1
12–17 months	2	1	1	4
18–23 months	2	3	3	1
Birth order				
First child	2	3	4	4
Second or older	4	3	3	2
Sex				
Boy	3	4	4	3
Girl	3	2	3	3
Provided Minimal Dietary Diversity (MDD)	4	1	3	4
Mother				
Employment duration				
>5 years	NA	3	3	3
≤5 years	NA	3	4	3
Age				
≥30 years old	4	2	3	3
<30 years old	2	4	4	3
Additional informants in each group				
Caregivers				
Grandmother	1	1	1	0
Babysitter	1	1	1	2
Family (husband)	1	1	1	1

NA=not applicable



(a) Practised by L, 33 years old, mother of 13-month-old boy; L is an administrative staff member and represents the working mothers at the skilled labour level



(b) Practised by ED, 40 years old caregiver of P's 17-month-old girl; P is a 34 years old and represents working mothers at the professional level

Figure 2. Examples of card-sorting activity and timeline for dietary diversity practice. The figures show (a) late introduction and inadequate dietary diversity by a mother at an unskilled labour level; and (b) more diverse complementary foods with timely introduction of animal protein by a mother at a professional level. (mo: months old of child age; yo: years old of child age)

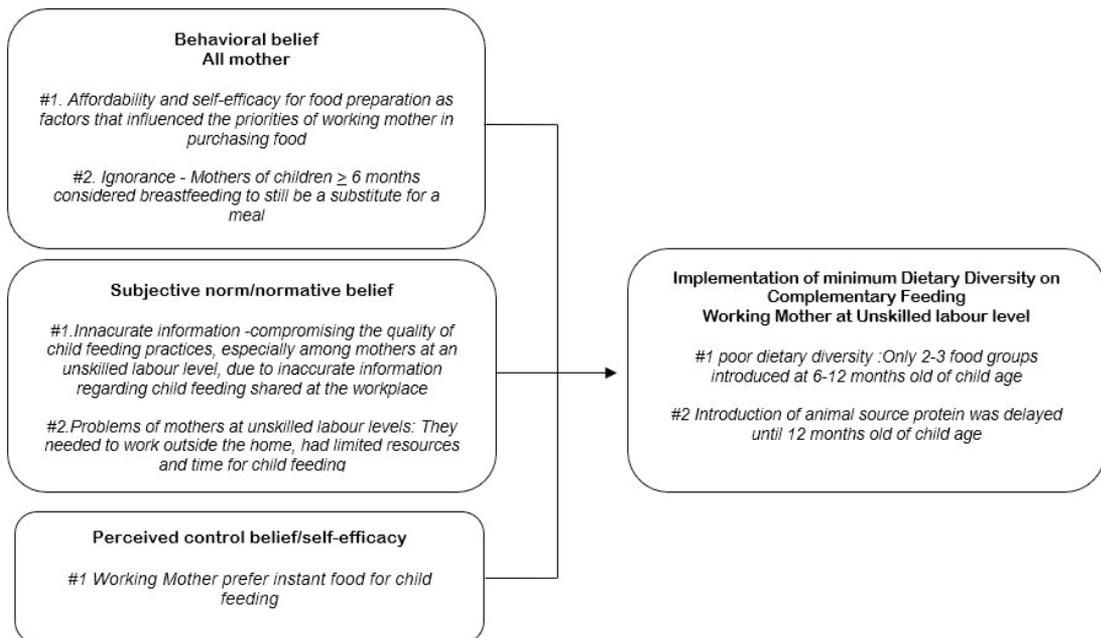


Figure 3. Emerging themes in this qualitative study based on the Health Belief Model

working mother and a caregiver at the lower occupational level were presented as follows.

“Porridge with sliced vegetables and probably minced banana or papaya... I think that was the only food that my child can have before one year old...” (Su, 27 years old, labourer in a garment factory, unskilled labour, mother of a 12-month-old girl)

“Why despite knowing that vegetables were important for the child at 9 months of age, yet I gave them at the age of 12 months? I just started with something that she (the child) likes such as chicken porridge and banana” (Y, 34 years old, paid caregiver of a 15-month-old girl whose mother works as a garment labourer, unskilled labour)

Beliefs regarding dietary diversity

The emerging themes that were identified in the study were used to understand

the poor dietary diversity practices that existed especially among working mothers at lower occupational levels. Most mothers considered breastmilk adequate for the child, and did not think that it was necessary to complement it with other foods, especially vegetables, which they considered were unsuitable for young children. The problems that these working mothers mentioned were as follows: (i) inability of the mother to cook, (ii) heavy dependence on a caregiver, (iii) lack of time for food preparation, (iv) children who were highly selective about the foods they eat, (v) children who disliked fruits and vegetables, and (vi) mothers who could not breastfeed. These working mothers preferred instant foods to complementary feeding because less time was required for preparing such foods.

These mothers also preferred to discuss their problems with other mothers and peers. However, the information regarding child feeding that they shared within their network

was found to be mostly inaccurate. Furthermore, mothers at the unskilled labour level were insufficiently exposed to health care information, either at their workplace or from other sources. The emerging themes that were identified based on the behavioural model are described in Figure 3.

Representative viewpoints

The following are examples that have been selected to represent the views of the various categories of employment in this study.

Emerging theme in behavioural belief #1: Affordability and self-efficacy for food preparation as factors that influenced the priorities of working mother in purchasing food

In prioritising food purchases, mothers generally preferred to provide staples with only one or two additional food groups. At an earlier age (6-9 months), fruit was preferred because it could be easily minced, and children, in general, liked the taste of fruits. When the children reached 12-23 months and were introduced to family food, fruits were given less frequently, because of its price. Vegetables were also given less often because the working mother said that they did not have enough time to prepare, and because the children did not like the taste of vegetables.

“She likes fruit... but we only buy fruit when we have extra money... Our priority is to buy chicken, tempeh (fermented soybean) followed by vegetables...” (E, 33 years old, administrative staff member, skilled labour, mother of a 13-month-old boy)

“We know that vegetables are important at her age, but it takes time to prepare... it also takes more time for her to chew the vegetable” (W, 35

years old, professional, mother of an 8-month-old girl)

Emerging theme in behavioural belief #2: Ignorance - mothers of children \geq 6 months considered breast milk as a substitute for meal

Most working mothers, especially those at the lower occupation levels, said they tried to continue to breastfeed when working, but faced challenges, such as storing milk at their workplace. Some mothers were not aware that breast milk alone was insufficient for children \geq 6 months of age. Some of these mothers continued breastfeeding the child as long as the child was satisfied, and did not introduce complementary feeding, especially among mothers with children aged 6-10 months.

“He is restless and crying when I get home, most of the time, I breastfeed him to make him sleep... And I think that’s enough food for him” (Ra, 27 years old, administrative staff member, mother of an 8-month-old boy)

“I give my expressed breast milk to my daughter after work... She enjoys it and then we play together until she falls asleep...” (Re, 29 years old, manager, mother of a 10-month-old girl)

Emerging theme in normative belief #1: Inaccurate information - compromising the quality of child feeding practices, especially among mothers at an unskilled labour level, due to inaccurate information regarding child-feeding shared at the workplace

Mothers at unskilled labour levels admitted their preference for sharing information and discussing feeding problems with their co-workers at their workplace. Such information presumably gathered from more experienced mothers.

It may have been inaccurate and this could account for the quality of child feeding practices being compromised.

Working mothers at the unskilled labour level seldom received health education about recommended feeding practices, in the workplace or from community health cadres. Most caregivers helping the mothers at the lower levels of occupation did not take the children for routine growth measurements at the integrated community-based health posts (called *Posyandu* in the Indonesian language).

“We never had a chance to bring our kid to Posyandu because we work... I am not sure my neighbour (who babysat her child when she works) would take her there” (N, 28 years old, an unskilled labourer working at a small garment factory, mother of a 15-month-old girl)

“I never took her to Posyandu... it’s not far ... but for me she’s healthy enough... her mom never asked me anyway” (Id, 28 years old, caregiver, helping Su, an unskilled labourer in a garment factory, mother of a 12-month-old girl)

By contrast, mothers working at higher occupation levels are well informed and reminded by other working mothers or health workers about healthy child feeding practices.

“I was advised by Mrs XX (her senior co-worker) to buy ready-to-eat infant porridge... because it is practical, time-saving and yet cheap” (Su, 27 years old, unskilled labourer in a garment factory, mother of a 12-month-old girl)

“I was once influenced by my friend (pointing at her working peer) to buy

‘healthy porridge’; but my child had diarrhoea and was admitted to a hospital after consuming porridge from the vendor. I did not know what was wrong with the porridge... it was traumatic... but I had no choice back then, because I could only prepare instant food” (Ef, 33 years old, administrative staff member, skilled labour, mother of a 13-month-old boy)

“I am happy with child care here (pointing at child care facility in the office), the nurse gave me information about how to prepare complementary food... We also have pictures of our children who succeed exclusive breastfeeding and reach 2 years old” (W, 35 years old, professional, mother of a 8-month-old girl)

“Here the moms (referring to her co-workers, who were also working mothers) are quite talkative about breastfeeding and child feeding... I hesitate if I failed to give my child proper feeding... Yes, they often protest if I say anything about instant food (for my child feeding)” (R, 28 years old, professional, mother of a 15-month-old boy)

Also, mothers working at higher occupation levels had access to breastfeeding rooms, child weighing programmes and education or consultation programmes, that are provided by the companies.

“We know that most of our staff here are the new moms... Therefore, we provide a special room for breast milk expression and a nurse to give them information about how to prepare food to their children” (W, 45 years old, manager of a private company, employer of professionals)

“Our breastfeeding room... with privacy for breast-pumping, refrigerator and health education brochures. But you may see the pictures of staff’s children who succeeded with exclusive breastfeeding or who are > 2 years old... It’s part of our motivational and education programme” (Re, 29 years old, manager of an international company, professional, mother of a 10-month-old girl)

Emerging theme in subjective norm/ normative belief #2: Problems of mothers at unskilled labour levels: They needed to work outside the home, had limited resources and time for child feeding

Mothers at unskilled labour levels had to work in informal sectors or small companies because their families needed the extra income. Some of them made time at night or in the early morning to prepare food or delegated food preparation to the caregiver. In delegating food preparation, some may have faced additional problems due to limited resources or money to be given to the caregiver.

“I pushed myself to get up earlier in the morning... then I cooked my child’s food... it was exhausting... but even though my husband asked me to resign, I am tied to a work contract at my company and my boss did not allow me to leave” (E, 33 years old, administration staff member, mother of a 13-month-old boy)

“She only gave me approximately 10.000 rupiahs daily for her child’s food... what do you expect me to do? So, I just buy any food I can with that amount of money... as long as she eats something” (En, child caregiver and neighbour of SL, who worked in a small garment factory, mother of an 18-month-old girl)

“In fact, it’s sad to leave my daughter and let my neighbour take care of her (while shedding tears) ... feed her... but what can I do... I need to earn... to work... because my husband’s income alone is not enough to feed our family...” (N, 28 years old, who worked in a small garment factory, mother of a 15-month-old girl)

Emerging themes in self-efficacy/control belief #1: Working mothers prefer instant foods for child feeding

Most working mothers at the lower occupation levels provided their child with instant foods because they thought such foods were nutritious and did not require much time to prepare. Non-working mothers were more likely to prepare and cook the foods themselves.

“Because I had to get back to work when the child was approximately 3 months old, I mostly prepared instant food from the supermarket” (L, 33 years old, unskilled labourer in garment factory, mother of an 8-month-old boy)

“Nowadays, we can easily buy healthy child noodles from street or legal vendors... they have good variations of sliced meat and vegetables” (N, 25 years old, secretary, mother of a 7-month-old boy)

“Every morning I decide what to cook for my child, based on what he likes, for instance, soft rice nasi tim... We bought the ingredients from the market 2-3 days before” (Si, 22 years old, non-working mother of a 9-month-old boy)

An officer at the Ministry of Health confirmed this issue and said that fortification of instant foods was a strategy in Indonesia to address the lack of nutrient diversity in instant foods.

“We are concerned that our diversification strategy may fail, knowing that the SUSENAS (National Indonesian Economy Census) data showed that our people’s consumption of instant foods has been increasing... therefore, the strategy of fortification of instant foods has become an unfinished debate” (AS, officer in the nutrition section at the Ministry of Health Republic of Indonesia)

DISCUSSION

To the best of our knowledge, the present study was the first in Indonesia that used a behavioural model to qualitatively explore the determinants of complementary feeding practices, especially dietary diversity, among working mothers at three occupational levels. By framing the emerging themes into a behavioural model, the study identified behavioural, control and normative beliefs that influence dietary diversity practice

Overall, working mothers faced difficulties in feeding vegetables to infants and young children, and wrongly believed that breast milk could replace complementary food beyond 6 months of age. The challenges in feeding young children vegetables were also noted (Knai *et al.*, 2006). In addition, this study identified poor dietary diversity practices that were specific to working mothers at lower occupational levels, including the late introduction of protein from animal sources, and the provision of staples with only one or two other food groups.

Women who joined the workforce were expected to become more empowered in some of the following ways: i) economically, through income generation and control over finances, ii) socially, through social support, access to health services, in control of own health care and greater mobility, and iii) legally, through better bargaining power

(Na *et al.*, 2015). However, in developing countries, there is an increasing number of mothers join at the unskilled labour level. As such, they are said to be in transition in trying to gain empowerment as they continue to struggle with limited resources (Razavi, 2012). The evidence that the empowerment of women improves complementary feeding practice is mixed (Vereecken & Maes, 2010; Malapit *et al.*, 2015). Malapit *et al.* (2015) reported that, in Nepal, women’s empowerment in areas such as control over income and reduced workload was positively associated with the improvement of children’s diets.

In this study, mothers working at the unskilled levels admitted that they needed to work to financially help their families. However, they experienced a loss of control over child feeding, owing to their dependence on others. By contrast, working mothers at higher levels of the workforce, who often chose to work as an act of self-actualisation, were involved in making decisions regarding child feeding. Thus, the different domains of women’s empowerment (control of resources and autonomy, workload and time, and social support) may relate differently to the dietary intake and nutritional status of a child (Cunningham *et al.*, 2015).

Mothers working at the unskilled labour level had a small network of peers whom they relied on to discuss child-feeding problems. However, this study found that they received compromised nutritional advice like the tendency to buy instant foods or the late introduction of animal proteins. Storey & Figueroa (2012) explained that behavioural change was influenced not only by individual thinking related to the benefit of action, but also the perception of others in the community. When the community constantly share inaccurate messages, it might lead to compromised norms of behaviours related to child care and feeding (Devine

et al., 2009). The normative beliefs that lead complementary feeding practices being compromised among unskilled labourers and the sharing of such beliefs among their peers, highlight the need for food literacy education for working mothers, especially among those at the lower occupation levels. Among the mothers at the unskilled work level, exposure to nutrition-related education and child-care support facilities were limited. Breastfeeding rooms and health education services by health professionals were found to be a part of employee facilities only in large companies, but not in unskilled labour workplaces. These working mothers also faced challenges to bring their children to the community health posts (*Posyandu*) for health-care needs. Socially disadvantaged working mothers in United States also experienced a similar situation of exposing their children to potential health and developmental risks (Grzywacs et al., 2010).

Thus, the delivery of nutritional education to improve feeding practices needs to be widely targeted to include health workers, family members and also peers of working mothers. This approach is in line with the initiative that addressed the first 1000 days of life by the Indonesian government, which emphasised the equal importance of breastfeeding and complementary feeding quality. In this regard, complementary feeding education must also be strengthened and balanced with breastfeeding education (Ministry of Welfare GoI, 2013). Since it is known that the workplace has a big contribution in developing the perspectives of mothers on proper child feeding practices, inter-sectoral collaboration among related government agencies such as the Ministry of Health, Ministry of Labour, Ministry of Industry and Ministry of Women Empowerment needs to be intensified. Further studies on effective educational

strategies in workplace settings to improve the quality of complementary feeding are much needed.

Limitations of study

As the sample size was small and the coverage was not wide, these findings do not necessarily represent the views of all working mothers in the study area. The participants were selected and stratified based on occupation levels, and the findings may be applicable to other individuals with similar characteristics and context (working mothers in urban areas).

CONCLUSION

The present qualitative study revealed that working mothers at lower occupation levels practised poor dietary diversity owing to several work-related factors. Efforts to provide correct nutrition information related to complementary feeding should be undertaken at workplaces, especially for working mothers, in the lower levels of occupation.

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Authors' contributions

AK, designed the study, conducted data analysis and prepared the first draft of the article; JF, designed the study, supervised data analysis and

contributed to the final draft of the article; MM, designed the study, supervised data analysis and contributed to final draft of the article; AS, designed the study and contributed to the final draft of the article.

Conflict of interest

The authors declare no potential conflicts of interest with respect to the research, authorship or publication of this article.

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Comparing intake adequacy and dietary diversity between adolescent schoolgirls with normal nutritional status (NG) and undernutrition (UG) based on BMI-for-age (BAZ) living in urban slums in Central Jakarta

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ABSTRACT

Introduction: Undernutrition among adolescent girls is an important concern due to their rapid growth velocity that requires adequate intake of energy and nutrients. This study compared intake adequacy and dietary diversity between adolescent public schoolgirls from slum areas in Central Jakarta who had normal and poor nutritional status. **Methods:** A total of 220 eligible girls aged 14–18 years were recruited, with an equal proportion in the normal group (NG) [-1 to +1 SD body mass index-for-age z-score (BAZ)], and undernutrition group (UG) (BAZ < -1SD). Dietary intake was assessed using two non-consecutive 24-hour recalls. Dietary diversity scores (DDS) were determined with reference to the intake of 13 food groups with a minimum daily intake of 15 gram/food group. Receiver operating curve analysis was performed to obtain the DDS cut-off. The Mann-Whitney test was performed to compare DDS between the NG and UG. Logistic regression analysis was conducted to examine the likelihood of potential factors in predicting nutritional status outcome. **Results:** Overall, almost half of the girls' daily food intake showed low dietary diversity based on DDS cut-off <5, with no significant difference between NG and UG adolescents. Protein intake inadequacy showed significant unlikelihood of a NG outcome (OR=0.4; 95% CI: 0.2-0.8), while low socioeconomic status (SES) showed a strong likelihood of an UG (OR=2.7; 95% CI: 1.3-5.5) compared to high SES. **Conclusions:** Low dietary intake and DDS were common among adolescent schoolgirls in slum areas in Jakarta. Nutrition interventions promoting appropriate dietary intake among adolescent girls are recommended.

Keywords: Adolescent girls, dietary diversity, nutrient adequacy, undernutrition, Jakarta slums

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INTRODUCTION

Adolescence is a critical period of physical growth and development. Undernutrition among adolescents is a public health concern in Asian countries with prevalence of > 20% underweight (Cappa *et al.*, 2012). In Jakarta, the prevalence of undernutrition in the form of thinness among adolescents was approximately 11.2% in 2010 (MOH Indonesia, 2013), indicating that adolescent undernutrition is at an unsatisfactory level (WHO, 2010).

Undernutrition during adolescence is of significance given that 50% of the adult weight and skeletal mass and 20% of the adult height are gained during this period. As the rapid growth velocity requires adequate intake of energy and nutrients, adolescents become vulnerable to nutrient deficiencies (Stang & Story, 2005). Adolescent girls in low and middle income countries (LMIC) are often reported to have a monotonous cereal based diet consisting of low nutrient-dense foods, resulting in an inadequate intake of energy and nutrients (USAID & SPRING, 2015). As a consequence, poor nutrition during adolescence affects the ability to learn, reduces work productivity, results in a failure to attain potential height and gain optimal bone mass in adulthood, and delays the onset and progression of puberty.

Several factors are known to lead to undernutrition. These include household food insecurity, intra-household allocation of food that does not meet dietary needs, livelihood insecurity, and poor knowledge of nutrition (WHO, 2005). Poor diet quality could be due to a lack of dietary diversity, which indicates consumption of a low variety of food. This condition has been shown to be associated with micronutrient inadequacy among children and

adolescents (Korkalo *et al.*, 2017; Zhao *et al.*, 2017). A higher household dietary diversity was reported to be associated with a lower likelihood of child stunting (Lee & Ryu, 2018; Mahmudiono, Sumarmi & Rosenkranz, 2017).

Studies determining dietary diversity among Indonesian adolescents in relation to undernutrition are few. This study was aimed at comparing the dietary intake adequacy and dietary diversity between adolescent schoolgirls with normal and poor nutritional status living in urban slum areas in Central Jakarta, Indonesia.

MATERIALS AND METHODS

Study design and subjects

This cross-sectional study was conducted in Central Jakarta. A list of schools was obtained from the Education Office of Central Jakarta, from which five high schools located in slum areas were randomly selected.

Sample size

As studies on dietary diversity of Indonesian adolescent girls are lacking, the sample size for this study was computed based on the results reported by Jayawardena *et al.* (2013), that underweight female ($BMI \leq 18.5$ kg/m²) had lower mean dietary diversity (5.69 ± 1.52) than those whose nutritional status was normal ($BMI > 18.5 - \leq 22.9$ kg/m²) (6.52 ± 1.47). Based on 80% power and a 95% confidence interval, a minimum sample size of 220 was estimated with an equal number for each group, that is 110 for the undernutrition group and another 110 for the normal nutritional status group.

The study inclusion criteria for selecting the participants were girls aged 14-18 years, who were post menarche and apparently healthy. A total of 1,073 schoolgirls from the public schools who

had met the study criteria were selected, and were invited for anthropometric screening.

Nutritional status

Anthropometric measurements were conducted following standard procedures (Gibson, 2005). Height was measured using the ShorrBoard (Weigh and Measure, LLC, USA), and weight was measured using an electronic SECA no. 876 weighing scale (Seca, Germany). The average of two consecutive measurements was used to calculate the body mass index-for-age z-score (BAZ) using WHO AnthroPlus software (WHO, 2009). The girls were classified into two groups based nutritional status. These were the normal group (NG) ($-1SD \leq BAZ \leq +1SD$) and the undernutrition group (UG) ($BAZ < -1SD$) (Thomaz, *et al.*, 2010). The 110 schoolgirls whose BAZ status was ($BAZ < -1SD$) agreed, on a voluntary basis to participate, and were classified to the UG. The other 110 schoolgirls with BAZ status ($-1SD \leq BAZ \leq +1SD$) were placed in the NG.

Data collection

All the eligible participants were interviewed by five trained enumerators, to collect data on dietary diversity, food consumption, morbidity (history of diarrhoea and upper respiratory tract infection in the previous one month), physical activity (PA), household food security, working and education status of mother, and household socioeconomic status (SES). The questionnaires on food consumption and dietary diversity were pre-tested on several adolescent girls from a public high school located in the study area. After pretesting, the questionnaires were revised to improve clarity.

Food consumption

Dietary intake was assessed using two non-consecutive 24-hour (24-h) food

recall periods, comprising one weekday and one day of a weekend. A four-stage multiple-pass interviewing technique was used in the 24-h recall method (Gibson & Ferguson, 2008). The national standardised food photograph book was used for the estimation of portion size (MOH Indonesia, 2014a). The daily nutrient intake was determined using the Indonesian food composition database and calculated by NutriSurvey for Windows, version 2007 (Erhardt, 2007). Energy and protein requirements were calculated by using an estimated energy requirement and protein requirement to specific body weight (FAO, WHO & UNU, 2001; WHO, FAO & UNU, 2007). Fat and carbohydrate adequacy were taken as meeting at least 77% of the Indonesian recommended dietary allowance (RDA) (MOH Decree, 2013). The estimated average requirement was used to evaluate micronutrient adequacy (WHO & FAO, 2006). A dietary intake that was above these requirements was classified as energy and nutrient adequacy.

Dietary diversity

A standardised individual dietary diversity questionnaire was used to obtain the dietary diversity score (DDS) (Arimond *et al.*, 2008). The DDS consisted of 13 food groups, namely starchy staples, legumes and nuts, dairy products, organ meats, eggs, small fish eaten with bone, meat ("flesh foods") and animal protein, vitamin A-rich deep yellow/orange/red vegetables, vitamin A-rich deep green leafy vegetables, vitamin A-rich fruits, vitamin C-rich fruits, vitamin C-rich vegetables, and lastly other fruits and vegetables.

Morbidity (upper respiratory tract infection and diarrhoea)

Participants with upper respiratory tract infection were identified based on medical diagnosis or reports of fever, sore throat, and cough in the previous one

month. Participants with diarrhoea were identified based on doctor's diagnosis or had experienced passing liquid or loose stools three or more times in the previous one month.

Physical activity

A short form of the international PA questionnaire (IPAQ) was used to determine PA during the past seven days (IPAQ, 2005).

Household food security

Household food security status was determined by using the food security survey module for children aged ≥ 12 years. The nine questions in the module about food situation at home during the past one month were answered by participants. Response to the questions were assumed to be an indication of the food security status of the children, as perceived by the family (Connell *et al.*, 2004).

Socioeconomic status

The SES of the household was determined based on ownership of assets consisting of the sources of drinking water, electricity and cooking fuel, ownership of toilet, type of latrine, final faecal disposal, ownership of a motorcycle, television, air-conditioner, water heater, 12 kg cooking gas cylinder, refrigerator, and car (MOH Indonesia, 2013).

Data analysis

The DDS was computed by assigning a score of one (1) for the consumption of at least 15g/day of a food group, and zero (0) score for intake < 15 g/day. The total score for the entire food groups ranged from 0-13. The receiver operating characteristic (ROC) curve was plotted to obtain the DDS cut-off corresponding to the nutritional status of the schoolgirls. For this purpose, we contrasted the DDS with the composite score for the

intake adequacy of energy and protein. The procedure yielded a DDS of 5 as the cut-off for dietary diversity with the area under the curve (AUC) of 0.65, sensitivity of 60%, and specificity of 64% ($p= 0.002$). This cut-off was also used in examining the relationship between the DDS and nutritional status.

PA was analysed according to the IPAQ guidelines. The subjects were requested to recall the duration of usual their PA in a week. The duration of these activities was then converted into metabolic equivalent (MET) – minutes per week and categorised into high, moderate, and low PA based on the IPAQ guidelines (IPAQ, 2005).

Household food security status was categorised as food-secure or food-insecure, based on the responses to the nine questions in the module. We examined under- and over- reporting of energy intake to check for potential bias in participant's dietary intake (McCrary *et al.*, 2002).

SES was constructed based on 13 variables that were used to indicate the wealth index (MOH Indonesia, 2013). By using principal component analysis (PCA), a reliability analysis was first conducted, yielding ten variables, which were screened providing a Cronbach's alpha of 0.686. The PCA yielded a correlation score of > 0.6 for the SES variables. The scores were then ranked into tertiles, where tertile one was the lowest and tertile three the highest SES.

The independent *t*-test was used to compare the differences in height and body weight between the two nutritional status groups (NG vs UG). The Mann-Whitney test was used to compare the differences in dietary intake and DDS between these two groups. The chi-square test was used to examine the independence between DDS (cut-off < 5 and ≥ 5 food groups) and nutritional status (NG vs UG). Logistic regression

analysis was undertaken to assess the relationship between the categorical potential predictive factors: DDS, intake adequacy (energy and protein adequacy), morbidity status (history of diarrhoea and upper respiratory tract infection in the previous one month), household food security status, and SES, in predicting the categorical outcome: normal nutritional status versus undernutrition. The potential predictors were selected according to the conceptual framework of nutritional problems and causal factors during adolescence; dietary inadequacies and infectious diseases are immediate cause of undernutrition in adolescence (WHO, 2005). The results of the logistic regression were expressed as the odds ratio and 95% confidence interval. Statistical analyses were performed using SPSS (version 20). *P* values <0.05 were considered statistically significant.

Ethical approval

The study protocol was approved by the Research Ethics Committee of the Medical Faculty of Universitas Indonesia in Jakarta (reference number 206/UN.2.F1/ETIK/2015, dated 16 March 2015). The subjects provided written consent prior to data collection.

RESULTS

The study was conducted from March to April in 2015. Out of a total of 220 eligible participants who were selected, 25 were excluded from data analysis due to under- or over-reporting of energy intake. The final analysis was performed on 195 participants, consisting of 100 adolescents in the UG and 95 in the NG.

The mean body weight and height were significantly different between the NG and UG. The mean body weight of the NG (49.3 ± 5.1 kg) was significantly higher than that of the UG (40.8 ± 4.0 kg)

(Table 1). However, the mean height of the NG at 1.53 ± 0.06 m was significantly less than that of the UG at 1.56 ± 0.06 m. This indicates that on average, the UG was thinner but somewhat taller than the NG. In line with this, the proportion of stunting was significantly higher in the NG compared to the UG (24.4% vs 12.0%, respectively; $p=0.029$).

The SES of the UG was worse off than that of the NG, with the former having a significantly higher proportion with low SES (50.0% vs 31.6%, respectively) (Table 1). Overall (i.e. NG and UG), more than half of the adolescent schoolgirls (55.4%) reported having upper respiratory tract infection while a lower proportion (12.3%) had diarrhoea in the previous month. There were no statistically significant differences in the morbidity status between the NG and UG. There was also no significant difference between the two groups in terms of the prevalence of household food insecurity (UG 60.0% vs NG 50.5%), and the proportion of working mothers (UG 25.5% vs 37.6% NG).

The median daily intake of energy, protein, and fat were approximately 1,500 kcal, 49 g, and 62g, respectively; these figures were 72.0%, 83.0% and 87.0%, respectively, of the Indonesian RDA (Table 2). There were no statistically significant differences in the intake of energy, macro- and micro- nutrients between the UG and NG.

Table 3 shows that, overall, <10.0% of the adolescents had adequate energy intake and >60.0% of them attained adequate intake of protein, fat, vitamin A and vitamin B₆. Nonetheless, very low proportions of the adolescents had adequate intakes of folate, calcium and zinc. There were no significant differences in energy and nutrient intake adequacy between the UG and NG, except for protein intake adequacy at 83.0% vs 65.3%, respectively.

Table 1. Anthropometric measurements, morbidity, household food security, and socioeconomic status of the adolescent schoolgirls according to nutritional status

	All (n=195)	Nutritional status		p†
		Undernutrition (BAZ<-1SD) (n=100)	Normal (-1SD ≤ BAZ ≤ 1SD) (n=95)	
Height, m (mean±SD)	1.55±0.06	1.56±0.06	1.53±0.06	0.06*
Weight, kg (mean±SD)	44.9±5.8	40.8±4.0	49.3±5.1	<0.001***
Stunting (Height-for-age z-score <-2.0) (%)	17.9	12.0	24.2	0.029*
Had upper respiratory tract infection in the previous month (%)	55.4	56.0	54.7	0.859
Had diarrhoea in the previous month (%)	12.3	10.0	14.7	0.317
Physical activity level‡ (%)				
Low	33.3	32.0	34.7	0.976
Moderate	64.6	66.0	63.2	
High	2.1	2.0	2.1	
Household food security status§ (%)				
Food secure	44.6	40.0	49.5	0.184
Food insecure	55.4	60.0	50.5	
Adolescent girls with working mother (n=191) (%)	31.3	25.5	37.6	0.073
Mother educational level (n=191) (%)				
Lower education (graduated from junior high school or less)	26.7	26.5	26.9	0.956
Higher education (attending high school or more)	73.3	73.5	73.1	
Socioeconomic status¶ (%)				
Low	41.0	50.0	31.6	0.005**
Middle	24.6	24.0	25.3	
High	34.4	26.0	43.2	

†T-test for continuous variables and chi-square test for discrete variable

‡Based on average MET-minutes per week (IPAQ, 2005)

§The sum of affirmative responses to the nine questions in the food security module for children aged ≥12 years (Connell et al., 2004)

¶SES was defined based on tertiles of wealth index score (household ownership of assets) (MOH Indonesia, 2013)

*p<0.05, **p<0.01, ***p<0.001

Table 2. Energy and nutrient intake among the adolescent schoolgirls according to nutritional status

	Nutritional status			p [†]
	All (n=195)	Undernutrition	Normal	
		(BAZ<-1SD) (n=100)	(-1SD ≤ BAZ ≤ 1SD) (n=95)	
		Median (IQR [‡])		
Energy (kcal/day)	1531.3 (1265.3–1865.1)	1556.6 (1281.2–1853.9)	1478.7 (1260.9–1883.9)	0.594
Protein (g/day)	48.9 (38.3–62.5)	49.0 (37.8–63.3)	48.8 (38.7–62.2)	0.744
Fat (g/day)	61.9 (47.5–79.1)	62.3 (50.6–80.8)	59.6 (46.1–77.6)	0.455
Carbohydrate (g/day)	198.4 (158.0–252.5)	205.2 (162.4–253.2)	197.5 (153.9–247.9)	0.385
Vitamin A (µg/day)	1068.1 (723.6–1627.2)	1059.3 (739.9–1615.9)	1082.5 (684.7–1627.2)	0.823
Thiamine (mg/day)	0.6 (0.4–0.9)	0.7 (0.5–0.9)	0.6 (0.4–0.9)	0.366
Riboflavin (mg/day)	0.8 (0.6–1)	0.8 (0.6–1.0)	0.8 (0.5–1.0)	0.359
Niacin (mg/day)	9.1 (6.9–12.5)	8.9 (6.4–12.6)	9.1 (7.1–12.4)	0.657
Vitamin B ₆ (mg/day)	1.2 (0.8–1.8)	1.2 (0.8–1.7)	1.1 (0.8–1.8)	0.539
Folate (µg/day)	124.0 (83.0–181.0)	130.0 (88.0–191.0)	118.0 (77.0–174.0)	0.080
Vitamin B ₁₂ (µg/day)	1.9 (1.3–3.5)	2.0 (1.4–3.5)	1.9 (1.2–3.5)	0.732
Vitamin C (mg/day)	24.1 (13.1–44.6)	24.9 (13.8–48.7)	21.9 (11.2–44.5)	0.339
Calcium (mg/day)	294.4 (219.5–421.2)	307.1 (229.3–420.3)	281.8 (190.7–426.6)	0.335
Zinc (mg/day)	6.5 (5.2–8.2)	6.3 (5.3–8.3)	6.6 (5.2–8.1)	0.114
Iron (mg/day)	7.7 (5.4–8.2)	8.0 (6.0–10.2)	7.2 (4.9–9.9)	0.971

[†]Mann-Whitney test

[‡]IQR=Interquartile range

Table 3. Percentage of the adolescent schoolgirls according to nutritional status meeting energy and nutrient intake adequacy[†]

	Nutritional status			<i>p</i> [‡]
	All (<i>n</i> =195)	Undernutrition (<i>BAZ</i> <-1 <i>SD</i>) (<i>n</i> =100)	Normal (-1 <i>SD</i> ≤ <i>BAZ</i> ≤ 1 <i>SD</i>) (<i>n</i> =95)	
Energy	9.7	12.0	7.4	0.276
Protein	74.4	83.0	65.3	0.005**
Fat	63.1	66.0	60.0	0.386
Carbohydrate	34.9	38.0	31.6	0.347
Vitamin A	92.8	95.0	90.5	0.226
Thiamine	22.6	25.0	20.0	0.404
Riboflavin	17.4	20.0	14.7	0.333
Niacin	47.7	47.0	48.4	0.843
Vitamin B ₆	61.0	63.0	58.9	0.562
Folate	6.2	7.0	5.3	0.614
Vitamin B ₁₂	49.2	50.0	48.4	0.826
Vitamin C	19.0	20.0	17.9	0.708
Calcium	0.5	1.0	0.0	0.328
Zinc	4.6	6.0	3.2	0.344

[†]Energy and protein requirements were calculated by using estimated energy requirement and protein requirement to specific body weight (FAO, WHO & UNU, 2001; WHO, FAO & UNU, 2007). Fat and carbohydrate adequacy were taken as meeting at least 77% of the Indonesian RDA (MOH Decree, 2013). Estimated average requirement was used to evaluate micronutrient adequacy (WHO & FAO, 2006). Dietary intake above these requirements was classified as energy and nutrient adequacy.

[‡]Chi-square test

***p*<0.01

Based on a DDS cut-off of <5, almost half of all the girls (46.2%) daily consumed a low diversity of foods, with no significant difference between the NG and UG (Table 4). The food groups consumed by the majority of all the adolescents on a daily basis were starchy staples (100%), flesh foods and animal protein (85.1%), legumes and nuts (55.9%) and egg (54.4%). They consumed a low percentage of fruits, only about one-third reported taking vegetables, on a daily basis. Significant differences were observed for the daily intake of legumes and nuts (NG 42.1% vs UG 69.0%), and vitamin C-rich vegetables (NG 14.7% vs UG 28.0%). Higher intake of legumes and nuts by the UG may explain the finding of significant

difference of protein intake adequacy between this group and the NG, as shown in Table 3. Daily consumption of the other food groups did not show significant differences between the NG and UG girls.

The logistic regression analysis showed that among the factors studied, two were found to have significant influence on the nutritional status outcome of the adolescent schoolgirls living in the slum areas of Jakarta. Household SES and protein intake adequacy were significantly associated with the nutritional status of the schoolgirls (Table 5). Protein intake inadequacy was associated with a less likelihood of attaining normal nutritional status (OR=0.4; 95% CI: 0.2-0.8;

Table 4. Distribution (%) of dietary diversity scores (DDS) and food groups consumed by the adolescent schoolgirls according to nutritional status

	Nutritional status			<i>p</i> [†]
	All (<i>n</i> =195)	Undernutrition (BAZ<-1SD) (<i>n</i> =100)	Normal (-1SD≤BAZ≤1SD) (<i>n</i> =95)	
Dietary diversity score, median (IQR)	5.0 (4.0–6.0)	5.0 (3.0–6.0)	5.0 (4.0–6.0)	0.113
DDS <5 (%)	46.2	43.0	49.5	0.365
DDS ≥5 (%)	53.8	57.0	50.5	
Food groups (%)				
Starchy staples	100.0	100.0	100.0	1.000
Legumes and nuts	55.9	69.0	42.1	<0.01**
Dairy products	42.1	41.0	43.2	0.761
Organ meats	5.1	6.0	4.2	0.572
Eggs	54.4	57.0	51.6	0.449
Small fish eaten with bone	4.6	3.0	6.3	0.271
Flesh foods and animal protein	85.1	81.0	89.5	0.097
Vitamin A-rich deep yellow/orange/red vegetables	33.8	33.0	34.7	0.798
Vitamin A-rich deep green leafy vegetables	23.1	22.0	24.2	0.715
Vitamin A-rich fruits	6.2	5.0	7.4	0.493
Vitamin C-rich vegetables	21.5	28.0	14.7	0.025*
Vitamin C-rich fruits	15.4	58.0	63.2	0.152
Other fruits and vegetables	39.5	42.0	36.8	0.463

[†]Chi-square test; Mann-Whitney test for dietary diversity score

**p*<0.05

***p*<0.01

Table 5. Logistic regression analysis in predicting nutritional status of the adolescent girls (n=195) according to potential factors

<i>Potential factors</i>	<i>Normal nutritional status vs undernutrition[†]</i>		
	<i>OR</i>	<i>95% CI</i>	<i>p</i>
Dietary diversity score (DDS)			
DDS ≥5 (reference)			
DDS <5	1.1	0.6-2.0	0.805
Dietary intake			
Energy intake adequacy (reference)			
Energy intake inadequacy	0.7	0.3-1.9	0.494
Protein intake adequacy (reference)			
Protein intake inadequacy	0.4	0.2-0.8	0.006**
Morbidity status			
Had upper respiratory tract infection			
Without upper respiratory tract infection (reference)	1.0	0.6-1.9	0.899
Had diarrhoea			
Without diarrhoea (reference)	0.6	0.3-1.6	0.328
Household food security			
Food secure (reference)			
Food insecure	1.3	0.7-2.4	0.405
Socioeconomic status			
High SES (reference)			
Middle SES	1.5	0.7-3.2	0.323
Low SES	2.7	1.3-5.5	0.006**

[†]Normal BMI-for-age score or BAZ: (-1SD ≤ BAZ ≤ +1SD) as reference vs undernutrition (BAZ < -1SD)

***p*<0.01

p=0.006). Schoolgirls from households with low SES were 2.7 times more likely to be undernourished than those from households with high SES (OR=2.7; 95% CI: 1.3-5.5; *p*=0.006). The other factors that were studied including DDS, energy intake, morbidity status, and household food security were not found to exert a significant influence on the nutritional status outcome of the adolescent schoolgirls.

DISCUSSION

Data on dietary intake and dietary diversity among adolescents are limited

in Indonesia. Interventions to improve the dietary intake of adolescents are also lacking. The results of this study provide some insights into the quality and variety of food consumed by adolescent schoolgirls from slum areas in Central Jakarta.

On the average, Indonesian adolescents showed a lower DDS (less than five food groups) than some other countries. By comparison, Iranian adolescent girls consumed an average of approximately six food groups (range 5–14 food groups) (Akbari & Azadbakht, 2014), and the mean DDS was 5.76 for

urban adolescent schoolgirls in Ethiopia with 76% of them having adequate dietary diversity (Birru, Tariku & Belew, 2018).

The diet of the adolescent schoolgirls in this study was predominantly based on starchy staples. More than half of the girls reported taking animal protein foods and legumes and nuts. A low percentage of them consumed fruit and vegetables on a daily basis, when compared to the finding of the national survey in Indonesia, which reported vegetable consumption among Indonesian adolescents aged 13–18 years at 94.7% (Hermina & Prihartini, 2016). In studies on adolescents conducted in Africa and Canada, low energy and nutrient intake were generally found in adolescents from households with low SES and food insecurity (Kirkpatrick & Tarasuk, 2008; Dapi *et al.*, 2010). In low income households, common barriers to low fruit and vegetable intake were the unavailability and poor access to affordable types of fruit and vegetables, a lack of knowledge about healthy foods, the poor quality of the produce, and budgetary constraints (Huang, Edirisinghe & Burton-Freeman, 2016). A poor knowledge of nutrition among adolescent school girls was reported by a study conducted in 12 districts of Indonesia, which showed that less than half of adolescents aged 10–19 years were aware of health benefits of fruits (43.7%) and vegetables (36.2%) (Sudirman & Jahari, 2012). Therefore, disseminating knowledge of the health benefits of fruits and vegetables is essential. The public sector should enable people to have better access to reduce retail prices so that a wider variety of foods is affordable to all socioeconomic strata in a community (Nair, Augustine & Konapur, 2016).

Several studies have revealed that dietary diversity is consistently

associated with micronutrient adequacy in children and adolescents (Korkalo *et al.*, 2017; Zhao *et al.*, 2017). Women of reproductive age in five developing countries reported that dietary diversity consistently predicts micronutrient adequacy (Arimond *et al.*, 2010).

This study showed that the adolescents had low nutrient intake, particularly of vitamin B₁, vitamin B₂, folate, vitamin C, calcium, and zinc. Macronutrient intake, except for fat, was below the national requirements for Indonesian adolescents aged 14–18 (MOH Indonesia, 2014b). The latest Indonesian dietary survey revealed that the highest proportion of energy inadequacy was among adolescents aged 13–18 (MOH Indonesia, 2014b). This is consistent with the literature regarding dietary intake among adolescents in developing countries, which has highlighted the poor diet quality in this age group (Ochola & Masibo, 2014). Their diets are known to be limited in diversity, particularly in the fruit and vegetable food groups (Zhao *et al.*, 2017). Further, energy and micronutrient intake were found to be inadequate in the majority of adolescents in developing countries (Ochola & Masibo, 2014). These findings indicate that nutrition policies and programmes are important to improve the food intake of adolescents for growth, cognition, and educational achievements (Ochola & Masibo, 2014).

This study found that low household SES had a strong influence on the nutritional status of the adolescents. This is consistent with findings elsewhere in other groups such as that of a study of pregnant women in Kenya, which reported that socioeconomic factors including employment status, household assets, and land ownership influenced dietary diversity in pregnant women (Kiboi, Kimiywe & Chege, 2017).

CONCLUSION

The diet of adolescent schoolgirls living in slum areas in Jakarta was inadequate in terms of dietary adequacy and diversity. The Indonesian Ministry of Health issued dietary guidelines in the 2014 on principles of a balanced diet. However, these guidelines may not be well disseminated, and key elements of it, including “consume a variety of foods”, are not widely known or understood. Interventions directed at promoting good diets through dietary diversification among adolescent schoolgirls, are recommended for schools and the community at large.

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Authors' contributions

RR, designed research, carried out data collection, analysed and interpreted the data, and developed manuscript; HK, designed research, interpreted the data and critically reviewed the manuscript; LBS, carried out data collection; LAAW, critically reviewed the manuscript; DHSD, designed research and critically reviewed the manuscript. All authors have seen and approved the final manuscript.

Conflict of interest

The authors declare no conflict of interest.

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Food purchasing behaviour among urban slum women in East Jakarta: a qualitative study

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ABSTRACT

Introduction: Urbanisation in Indonesia has been associated with a transition in nutrition which has been, in part, marked by an increased purchasing of ready-to-eat, energy-dense, nutrient-poor foods. Women are responsible for purchasing and preparing food for the family. Their purchasing behaviours differ in various environments and population groups. This qualitative study was undertaken to explore the food environmental factors that influenced food purchasing behaviour of women who were the household food gatekeepers. **Methods:** The study was conducted in a slum area in East Jakarta. Eighteen overweight-obese and non-obese women who fulfilled the study's inclusion criteria were recruited for interviews that used a semi-structured questionnaire. Emic observations were conducted in order to identify typical food purchasing activities. The data were coded and categorised using qualitative data analysis and research software (Atlas.ti 7 for Windows). **Results:** Most of the women purchased ready-to-eat foods rather than cook at home, either for the family or their own consumption. Several food environmental factors influenced women's purchasing behaviour, including time and cost efficiency, food availability, family, exposure to ready-to-eat foods and food store marketing strategies. These factors led to the consumption of unhealthy foods that were high in fat, carbohydrate, sugar and salt that some of which may cause obesity. **Conclusion:** Purchasing unhealthy food was observed to be strongly linked with food-related environmental factors. This study provides an understanding of women's food purchasing behaviour and highlight potential ways to foster healthier purchasing behaviour among urban slum dwellers.

Keywords: Food purchasing behaviour, food environment, food stores, urban slum women, Indonesia

INTRODUCTION

Overnutrition results in being overweight and obese. Its related consequences are a major concern worldwide (Center

for Chronic Disease Prevention, 2010; Abraham, Miruts & Shumye, 2015), including Southeast Asia (Ramachandran *et al.*, 2012). The Indonesian basic health surveys of

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2007, 2010, 2013 and 2018 recorded substantial increases in the prevalence of overweight and obesity of 19.1%; 26.9%; 33.0% and 35.4%, respectively, among adult women, especially those living in urban slums (Kemenkes RI, 2008; Kemenkes RI, 2010; Kemenkes RI, 2013a; Kemenkes RI, 2018). Meanwhile, the prevalence of thinness among adult women has decreased from 14.8% to 10.1% between 2007 and 2013 (Kemenkes RI, 2008; Kemenkes RI, 2010; Kemenkes RI, 2013a). The increasing trend of overweight and obesity among adult women is expected to persist as migration from rural to urban areas in Indonesia is projected to rise (United Nations, 2014). The city of Jakarta being the most desired destination of poor migrants (Harahap, 2013), has a higher prevalence of overweight and obesity among women (40.8%) than the national average (33.0%) (Kemenkes RI, 2013b).

Urbanisation is associated with a change of nutritional practices that is marked by an increase in the consumption of energy-dense foods (Kac & Pérez-Escamilla, 2013; Ramachandran *et al.*, 2012). It has been reported that low income inhabitants in urban slums, consume more convenience foods rather than fresh foods (Smil, 2000). This problem may be exacerbated among women who were unable to select healthier foods for their family within their limited budgets, especially in areas where food diversity is restricted (Akter, 2009; Kimani-Murage *et al.*, 2014). In addition, neighbourhood food stores in urban slums offer mainly low-quality foods to match the low purchasing power of these women (Mikkelsen & Chehimi, 2007). Food insecurity and undernutrition in urban slums often arise from lack of access, availability and diversity of healthier foods (Mohiddin, Phelps & Walters, 2012).

The food purchasing behaviour of women are influenced by household and

environmental factors, such as family income, food price, food availability and practicality (Kimani-Murage *et al.*, 2014; Antin & Hunt, 2012). A study among low income Spanish families revealed that food purchasing without proper nutrition knowledge and skill led them purchased calorie-dense, low fibre, and high in fat and carbohydrate foods. (Cortés *et al.*, 2013). This is reasonable, since energy density and energy cost are inversely linked, and “obesity-promoting” foods offer more dietary energy at reduced cost (Drewnowski & Specter, 2004). Foods high in fats and carbohydrates are rendered more palatable as they provide more sensory enjoyment and delay satiety (Johnson & Wardle, 2014). Unfortunately, these are the types of foods that low income families can afford.

Living in an environment where affordable, ready-to-eat foods are available, and where the time for food preparation is limited, women tend to seek alternatives to cook at home (Vabø & Hansen, 2014; Worsley *et al.*, 2014). In view of a paucity of studies investigating the factors that influence food purchasing behaviour in Indonesia, the present qualitative study is aimed at investigating the association between the food environment in an urban slum setting and women’s food purchasing behaviour.

MATERIALS AND METHODS

Study setting

East Jakarta is the most desired destination for Indonesians who migrate from rural to urban areas (Hasudungan, Antokida & Dewi, 2018). The Jakarta District (DKI Jakarta, “Special Capital District”) had the third highest adult overweight and obese prevalence among the provinces in Indonesia (Kemenkes RI, 2013b). *Kampung Melayu* was purposively selected among the villages

in the area, since it had the highest social vulnerability index in the district, indicating that *Kampung Melayu* was at high risk of poverty, health, social and economic problems (Badan Pusat Statistik Provinsi DKI Jakarta, 2014).

Study participants and recruitment

Eligible participants were women aged 19–60 years, residing in *Kampung Melayu*, in apparently good health and who were not pregnant or disabled. The recruitment of participants was based on the following criteria: level of education (elementary/junior/senior high school/diploma), working status (yes/no), self-reported body mass index (BMI) categories (non-obese/overweight-obese) and whether they had children (<5 years old/older). Differences in the BMI status were noted in order to investigate different weight manifestations within the same food environment. A female community health volunteer (FCHV) who was actively involved in communal activities was approached to help recruit the targeted participants. Recruitment was stopped when thematic saturation was achieved, that is, when no new insights emerged from the interviews. A total of 18 women, 12 non-obese and six overweight/obese, were recruited and all of them completed the study.

Ethical considerations

The research proposal was fully

approved by the Health Research Ethics Committee of the Faculty of Medicine, Universitas Indonesia (approval number 143/UN2.FI/ETIK/2015). Written informed consent was obtained from each participant prior to data collection.

Data collection

Data were collected using in-depth interviews of the participants. All interviews were conducted in the Indonesian language (*Bahasa Indonesia*). A semi-structured questionnaire was developed by the first author, in consultation with the second and third authors. The questionnaire was pilot tested in another nearby village to ensure the reliability and consistency of the questions. Table 1 shows the semi-structured questionnaire that was used in the interviews.

The first author spent one month, from November to December, 2015, staying in *Kampung Melayu* village for data collection. Data collection commenced with a transect walk to map out the physical setting of the area, as well as engaging with key persons, such as the FCHV and the community leader. In-depth interviews were conducted face-to-face with the selected 18 women. Participants were individually interviewed for approximately one hour. All interviews were audio-taped with the permission of the participants, and field notes were taken by a research assistant

Table 1. Semi-structured question guide used in in-depth interview of the participants (n=18)

Item	Question
1.	Based on your experience as food gatekeeper, what do you do to prepare food at home for breakfast/lunch/dinner?
2.	How often do you buy outside food to provide food at home? What kind of food do you usually buy and why?
3.	What are the factors that influence you to buy food rather than to cook at home?
4.	What do you purchase when your household have or does not have enough money?
5.	Based on the figure scale, which figure represents your body?

to capture unspoken information such as actions. Interviews took place at the residence of either the participants or FCHV. No interview was repeated.

Each informant was requested to choose a rating scale of photographic figures (Figure 1) that she perceived was closest to her own body weight (Mutale et al., 2016). Each response was then cross-checked with her self-reported body weight and height, and physical appearance.

In addition to the interviews, the first author was involved in gaining an emic perspective of the residents' norms, beliefs and way of life, including how they interacted with each other and with their surroundings. Specifically, by staying within the community, the researcher gained access to the food purchasing activities of the residents, which took place around the clock every day, enabling the researcher to assess the extent to which the food environment provided the needs of the community.

Data analysis

The verbatim transcripts from the interviews served as raw data. They were analysed using a thematic analysis that allowed the identification of categories

or themes within the qualitative data (Maguire & Delahunt, 2017). Observation notes, videos and pictures were used to complement the transcription. The entire process was summarised into five steps. The first step transcribed the recorded interview to produce a ready-to-import-file for input into the software. In the second step, the authors read repeatedly the transcripts in order to be familiar with the data. The third step attached labels to the data to identify codes and categories using Atlas.ti 7 for Windows. Similar codes and categories were grouped to identify themes for the fourth step. Gathering the codes led to a comprehensive view of information. In the last step the authors repeatedly reviewed the data to identify the flow for final analysis.

RESULTS

The 18 participants were aged 28-51 years. Most were senior high school graduates, not working and had under five children (Table 2). Among the participants, 12 were non-obese and six were overweight/obese based on self-reported body weight and height estimations. Purchasing food from nearby

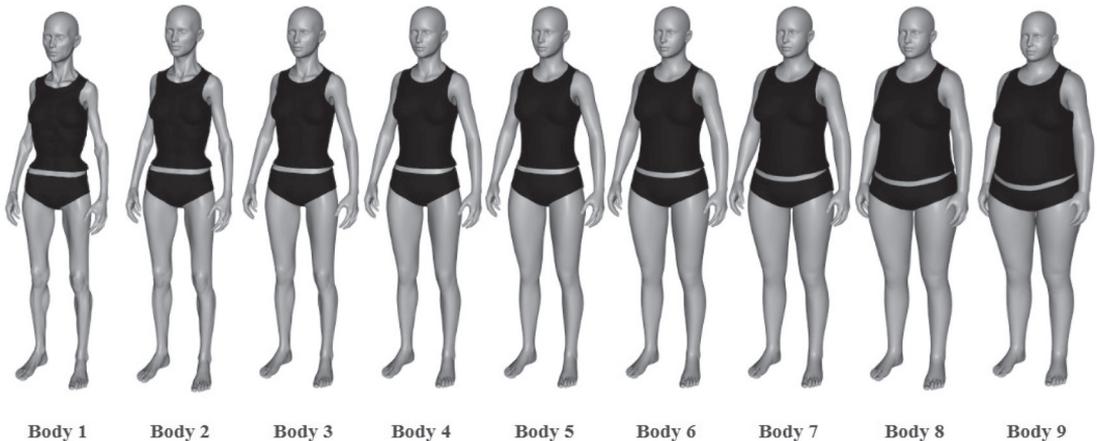


Figure 1. Photographic figure rating scale: bodies 1-3 are underweight, bodies 4-6 are in the normal BMI and bodies 7-9 are overweight/obese (Mutale et al., 2016)[†]

[†]Notes: In this study bodies 1-6 were classified as non-obese

food stores was carried out daily by most of the women in *Kampung Melayu*, either for providing food for their families or for their own consumption. This behaviour was repeated every meal time by both obese and non-obese women, regardless of the working status. The reasons for this were time and cost savings, food availability, family influences, the high exposure of ready-to-eat foods and food-store marketing strategies.

Saving time and cost

Working women preferred to purchase food in the morning in order to save time and cost. They needed to leave early to avoid traffic congestion, and so some of them preferred to buy breakfast in the office canteen. However, a few working women still managed to have breakfast at home, since their mother cooked for the family.

“I buy breakfast in my office canteen, I usually eat rice with egg or rendang (Padangnese beef cuisine). I felt it is impossible for me to cook in the morning since I need to go for work

early to avoid traffic jam, and also I need to take my child to school” (non-obese, 33 years old)

“My parents and I live in different homes. However, when I go to work, my mother takes care for my children and cooks for all of us” (non-obese, 33 years old)

Most non-working women also preferred to purchase food for breakfast since they prioritised time for other tasks such as sending child to school, cleaning the house, washing clothes and taking care of young children, rather than cooking. Due to exhaustion after finishing household chores, some women do not cook for the rest of the day.

“After washing and ironing the clothes, or tidying up the house I feel tired, I will not cook and just buy the foods like chicken wings” (overweight, 38 years old)

There were, however, a few non-working women who cooked at home rather than

Table 2. Characteristics of the study participants (n=18)

Characteristic	n (%)
BMI category based on photographic figure rating scale	
Non obese	12 (66.7)
Overweight-obese	6 (33.3)
Age (years)	
19–30	3 (16.7)
31–50	15 (83.3)
Educational attainment	
Elementary school	1 (5.6)
Junior high school	5 (27.8)
Senior high school	8 (44.4)
Diploma	4 (22.2)
Occupation	
Not working	12 (66.7)
Working	6 (33.3)
Living with children under 5 years old	
Yes	13 (72.2)
No	5 (27.8)

purchase outside food, out of concern for hygiene. By cooking at home, they could ensure the cleanliness of the food that was consumed.

“I don’t like buying ready-to-eat foods. I am sorry but it is sometimes smelly, the chilli smells uncooked or spoilt and isn’t tasty. I don’t mean to be conceited, but the seller also uses too much oil. As such, it is better to cook at home. We know the quality of the ingredients and it is cleaner” (obese, 33 years old)

Cost was another factor mentioned by the participants. Most of the women believed that cooking at home cost them more than purchasing ready-to-eat foods. However, there were a few women who said contrary, that cooking at home was less expensive when considering the number of family members needed to be fed. They had more than two children and felt it would cost them more if they purchased food from outside and therefore preferred to cook at home.

“...I visit the traditional market only once in a while because I rarely cook at home. I spend almost IDR 85000 (USD 6) a day if I cook, but I spend only IDR 50000 (USD 3) if I purchase foods” (obese, 32 years old)

Time and cost factors were linked to each other and to the type of food purchased. Those working women who perceived that spending money for purchasing foods was cost-effective did so as long as they could save more time to attend to other matters.

“Well, I realize that my time is tight. Any means of saving more time is important, including buying ready-to-eat-foods, so that I can do other things” (non-obese, 33 years old)

With a limited food budget, women tried to buy foods that matched their demands for inexpensive, tasty and foods that make them feel full. An example of such food was “*Kerongkonggan*” (fried chicken flank with minimal flesh and marinated with seasonings) that regarded as cheap, tasty, affordable and which could be shared within family. Chicken thighs and breasts that contained less skin were less preferred because they were more expensive and not as tasty as chicken wings and chicken feet. Seafood and beef were less preferred because they were expensive. Beef was only consumed at the annual Muslim celebration of Eid, and they had to save money for a year to be able to afford it.

“The chicken wings only cost IDR 3000 (~ USD 0.23) and IDR 2500 (~ USD 0.19) for chicken’s head, but chicken breast and thigh are more expensive. They also prefer to buy kerongkonggan because it costs only IDR 5000 (~ USD 0.38) for a whole chicken, not pieces, so then they can share it with other family members” (43-year-old FCHV)

Food availability

Most of the women who did not cook, purchased vegetable dishes at neighbourhood food stalls. The preferred vegetables were mostly stir-fried because they were tastier and readily available. Vegetables in the meals were visibly soaked in cooking oil. Clear vegetable soup was less often consumed as it was considered tasteless due to its low fat content, and regarded as a meal for sick people. Those who liked clear soup had little choice as sellers had only one or two types of soups, that sold for IDR 2,000 or ~USD 0.15.

“I prefer stir-fried vegetable rather than clear vegetable soup like spinach soup, because it tastier. For instance,

I like long beans stir-fried mixed with sprouts” (non-obese, 30 years old)

“I feel that stir-fried vegetables are tastier and more flavourful. Clear soup just makes me feel like a sick person (laughing). It is cold and tasteless” (obese, 28 years old)

One obese woman admitted that she never consumed vegetables as it made her feel bloated. Only two overweight women reported daily consumption of vegetables. However, their vegetable consumption was driven by the wishes of their mothers during lactation and a feeling of guilt about discarding leftovers.

“I don’t eat vegetables. I don’t like it, but my children do. I don’t feel satisfied eating vegetables; my tummy feels bloated” (obese, 32 years old)

“I started to eat vegetables after giving birth. Before that, I only liked stir-fried side dishes, such as prawns. After giving birth, my mother suggested to me to eat vegetables like spinach soup, so that I could produce more breastmilk” (overweight, 29 years old)

“Actually, I like to eat dried meals (without vegetables). In other words, I cook vegetable dishes only for my children because they like it. If there is any left-over after my children have eaten, then I will finish it as I just don’t want to throw away edible foods” (overweight, 48 years old)

Fruit consumption was infrequent among the women because they considered it expensive. Few women consumed fruits daily. One overweight woman consumed fruits only when she had enough money and bought low-quality fruits at cheaper prices. She was used to buy *buah busuk*

(BS), which is half-rotten fruits sold cheaper than fresh fruits. BS is usually sold by sellers who bought sorted-out and poor-quality fruits, such as mangos, melons and oranges, at cheap prices from the market.

“My husband usually buys BS four times a week because the children like to eat fruits. Yesterday, he paid IDR 7000 (~ USD 0.52) for eight big-sized mango” (overweight, 32 years old)

Family influence

Family played a significant role in the purchasing behaviour of many of the women. As mothers, most of the women tried to satisfy their children. The children usually longed for different foods at every meal time and disliked frequently having to consume the same dishes. However, the mothers could not afford to cook different dishes for every meal. If the mother was forced to cook and serve the same menu for a whole day, the children would not eat it and in the end the food would be discarded.

“I rarely cook, because having many children made cooking at home complicated as they want different dishes. One child wants to eat fish while another one wants to eat chicken, and so on. So, I just cook rice and buy the side dishes” (overweight, 29 years old)

The eating habits of husbands also influenced women’s purchasing behaviour. Women whose husbands went to work very early, such as before 5 am, buy food from *warung subuh* (food stores that open at 3-7 am). This helps the working wives to prepare food in the early morning. Meanwhile, husbands who returned from work late in the evening, purchased foods for supper

Table 3. Food shops / stores in *Kampung Melayu*

Type	Products sold	Customers	Operating hours	Price range	Mode of payment	Marketing technique
Food stalls	Cooked meals (rice, vegetables side dishes)	Women	Open at 11 a.m., some open for 24 h	IDR 1,000–8,000 (approximately USD 0.07–0.59)	Cash and credit	Word of mouth
Grocery stores owned by locals	Day-to-day foods, snacks, other non-food items, smaller products or more economical sizes or sachets	Women, men, children	6 a.m.–10 p.m.	IDR 1,000–30,000 (approximately USD 0.07–2.23)	Cash and credit	Reward system in holiday seasons
Mobile food stalls	Sweetened beverages, homemade fritters, other snacks, local meatball soup (<i>bakso</i>), other local dishes such as <i>soto</i> (chicken soup with vermicelli)	Women, children	8 a.m. until past midnight	IDR 1,000–10,000 (approximately USD 0.07–0.74)	Cash	Noise signal
Market	Raw foods (vegetables, fruits, meat), manufactured items, non-food items	Women	5 a.m.–1 p.m.	Starts at IDR 1,000	Cash and credit	Initiate contact
Convenience store located on main roads	Manufactured foods, snacks, drinks and day-to-day foods, selected fruits, non-food items	Women, men, children	7 a.m.–10 p.m.	Starts at IDR 2,500 (approximately USD 0.19)	Cash	Discount, bundling of goods, free items and door-to-door promotion

the area, and Table 3 shows further information of each store. The map figure shows that food stores were densely located at street intersections. The major type of food store was the food stall that provided cooked food, which sold for prices that ranged from IDR 1000-8000 (USD 0.07-0.59). Another major type were the grocery stores that provided snacks, other foods and non-food products. Non-working women tend to gather to chit-chat over snacks such as fritters and sweetened beverages.

“...when I am alone I may just drink 1 cup of ice tea, but when I gathered with other women I would buy another portion again when my last portion was finished. I just feel comfortable with the togetherness...” (non-obese, 34 years old)

The nearest traditional market was situated 10 minutes away from the residential area. It provided more varieties of both fresh and cooked foods. The market was mainly visited by food sellers and those who cooked at home. Those who did not cook regularly went to the market only when they wanted to purchase items that were not available in food stores nearby their residence.

“I used to visit traditional market after taking my child to school, only for purchasing kue pancong (Jakarta traditional cake)” (non-obese, 33 years old)

Food store marketing strategies

The food stores used several promotion strategies in *Kampung Melayu*, to encourage consumer loyalty. Convenience stores often sold commonly consumed foods such as cooking oil, sugar, biscuits and other foods that were bundled together at reduced prices or with free gifts. Women were often interested in purchasing items that were

being promoted that met the needs of their families such as milk and diapers. Grocery stores also used rewards in the form of clothing and food gifts given during Muslim celebrations. Food stalls also offered credit to retain the women as regular customers for their daily food purchases. The repayment of the credit was done on a monthly basis after receiving money from their husbands.

“I have been buying items for my daily needs for 2 years from that grocery store. Usually, I buy rice and pay later. The seller allows me to pay on credit. He also gives me biscuits or cookies and syrup near Muslim celebration” (non-obese, 32 years old)

DISCUSSION

This qualitative study provides some insights into the food purchasing behaviour of women in an urban slum setting. To the best of our knowledge, this study topic was one of the few that had been conducted in Indonesia using an ethnographic approach. Previous studies had reported that various factors such as family income, food price, food availability and practicality influenced the food purchasing behaviour of women in urban slums (Antin & Hunt, 2012; Kimani-Murage *et al.*, 2014). However, our study also highlighted the importance of understanding other factors that influenced the food purchasing behaviour of women in urban slums, such as time constraints faced by working women, nuclear versus extended family members and the presence of neighbourhood food stores.

The low-income urban residents in this study mostly relied on purchasing ready-to-eat foods from neighbourhood food stalls. Therefore, the daily food consumption for breakfast and the rest of the day, was driven by the availability of food that was sold in the vicinity.

Many working and non-working women purchased ready-to-eat foods due to time constraints. This was consistent with the results of a study in India where women reported that their business and work demands, discouraged them from preparing food at home, and lead them to purchase ready-to-eat foods (Salomi & Revathy, 2014). Cooking at home takes time and a study in Australia estimated an average of 66 minutes was required for preparing a meal for the family; working women could not afford such time on working days (Worsley *et al.*, 2014).

The cost of food was an important factor that influenced the food purchasing decisions of women. Women with ≥ 2 children considered purchasing foods was costlier than cooking at home. For women with fewer family members, they reported that purchasing food was less costly since the food offered by nearby stores could be shared. However, with limited budgets, they tended to purchase outside foods that were high in energy (e.g. fried foods) and had poor nutrient content (e.g. fewer fruits and vegetables) (Drewnowski & Specter, 2004). As a result, women and their families were exposed to consuming obesogenic foods (Bray & Popkin, 1998). The situation in the Jakarta slum highlights the need for women to be provided with the knowledge and skills to select healthy foods within their meagre budgets.

The results of the present study were consistent with previous research (Inglis, Ball & Crawford, 2005; Lupton, 2000), which suggested that for many women, their food preferences came second after their husband or children. Children influenced their mothers by expressing their preferences, negotiating, persuading, making demands and refusing to eat the foods that their mothers served (Alm, Olsen & Honkanen,

2014). Clearly, family support for healthy consumption is an important influence on women's purchasing behaviour.

Late night eating by obese women, reflected impulsive buying. Although the reason for having a late supper initially came from the husband, a previous study has shown that sensory cues like good smell of food, attractive food displays and appealing sounds from food preparation done by food sellers were a positive stimuli for impulsive food purchasing (Choi, 2016).

The purchasing behaviour of the women was found to be influenced by the availability of the foods in the local stores. Food purchasing behaviour could be formed by repeated exposure towards ready-to-eat foods. Economists suggest that either supply or demand factors or both could cause variations in what and where food stores are available (Ploeg, 2010). The neighbourhood may lack fresh food if the demand is low. Abundance of food stores leads to competition to attract customers. Marketing strategies, particularly in grocery and convenience stores, were aimed at retaining customers. In this study, several stores gave gifts during the Eid al-Fitr (a Muslim celebration) and allowed purchasing on credit. A US study conducted among thousands of household heads revealed the reasons for patronage. These included free gifts and special deals that were offered, preference for the payment method and proximity to the homes of customers (Moschis, Curasi & Bellenger, 2004). Financial benefits in the form of rewards or special discounts to loyal buyers was a common form of attracting customers. This finding was consistent with that of Ashman (2000) who studied American loyalty reward programmes. The strategy required customers to spend a fixed amount of money over a period of time

in order to receive a free gift, such as a Thanksgiving turkey or an Easter ham, when they reach a required spending threshold.

Health promotion programmes that target healthy food purchasing behaviour should aim to motivate and educate individuals to choose healthier foods that match their budgets. This is one of the few qualitative studies that has applied an ethnographic approach to investigate the environmental influences on the food purchasing behaviour of women in an urban slum setting of Indonesia.

Overall, this study raises important implications for the government and the private sector. It highlights the need to increase the awareness of healthy food purchasing. It also underlines the importance of empowering women as the household food gatekeepers in preparing meals at home and in introducing affordable food pricing and diversity policies into government's agenda. Appropriate collaborative interventions that address urban slum food environmental influences should be undertaken. It should be aimed at modifying the skills and motivation of both food sellers and women to provide and purchase healthier foods, respectively. In the longer term, the effort may help to reduce the prevalence of obesity and malnutrition.

CONCLUSION

The present study provides a contextual understanding of the factors involved in the food purchasing behaviour of women in the urban slum of *Kampung Melayu*, East Jakarta. The factors that were identified included time and cost efficiency, family influences, food availability, high exposure of ready-to-eat foods, and proximity and marketing strategies of food stores. At the micro-level, qualitative data and information

that is generated should be useful for the government, the health services and the private sector organisations who will need to collaborate on policy matters such as pricing strategies to promote the purchase of healthier foods.

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Authors' contributions

DS, contributed to the conception and design of the work, conducted data collection and data analysis, compiled the first draft of the manuscript; JF, contributed to the conception and design of the work, conducted data collection and data analysis, revised and approved the final draft; SB, contributed to the conception and design of the work, revised and approved the final draft; HK, contributed to the conception and design of the work, revised and approved the final draft; EE, contributed to the conception and design of the work, revised and approved the final draft; PHR, contributed to the conception and design of the work, revised and approved the final draft; AW, contributed to the conception and design of the work, revised and approved the final draft.

Conflict of interest

All authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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Exposure and approval of food marketing strategies: a mixed methods study among household food providers in Jakarta

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ABSTRACT

Introduction: Food marketing influences consumers' food choices leading to unplanned food purchasing. **Methods:** This study used a mixed methods approach to investigate the association between food marketing exposure and approval of food marketing strategies among household food providers in Jakarta. Responses from 279 survey participants to questions on exposure and their approval of marketing strategies were analysed. An additional 16 informants who fulfilled the inclusion criteria were recruited for the in-depth interview. Logistic regression was conducted to assess the relationship between the categorical predictor variable ("exposure to active or passive marketing") and the categorical outcome variable ("approval response to food marketing strategies"). **Results:** Almost half of the respondents reported not having exposure to active marketing in the past month, whereas approximately one-third had experienced such exposure 1-2 times. Most of the respondents disapproved the marketing of fast foods and sugar-sweetened foods. The highest disapproval was for the placement of vending machines carrying such foods in schools (69.9%). Respondents who were exposed to active marketing at least once in the previous month were 1.99 times more likely (AOR; 95% CI: 1.07-3.73) to approve the marketing of unhealthy foods. **Conclusion:** Exposure to food marketing promotion appeared to influence approval of marketing strategies among household food providers in Jakarta. In-depth interviews provided supportive evidence for the quantitative results. A mixed methods approach is suggested for larger studies to confirm these findings.

Keywords: Food marketing exposure, approval of food marketing, household food providers, Indonesia

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INTRODUCTION

The concept of nutrition transition with implications for health, developed by Popkin (2002), described the shifts in diet and lifestyle that paralleled urbanisation and industrialisation. One of the major dietary shifts is the increased consumption of energy-dense, nutrient-poor food, especially in developing country (Hawkes, 2007). This phenomenon is associated with the increased availability and accessibility of processed food, which are accompanied by sophisticated marketing systems (Swinburn *et al.*, 2004). The media is used in many sectors, including the marketing of food products, to create brand awareness and induce purchasing (Nielsen, 2010).

Food marketing uses multiple channels to reach consumers. They may be broadcast and non-broadcast channels, online games and social media, to make consumers aware of a product and persuade them to try it (WHO, 2013, Colby *et al.*, 2010). Food marketing is known to influence a consumer's food preference (Kirkpatrick, Reedy & McKinnon 2010) leading to unplanned food purchases (Scully *et al.*, 2012).

Indonesia is a rapidly developing nation that is undergoing the nutrition transition. According to an international survey, Indonesia has the highest rate of unhealthy food marketing exposure in the Asia-Pacific region. A reason for this is the lack of government regulations (Harris, Bargh & Brownell, 2009; Susyanty *et al.*, 2013). The situation indicates a highly unfavourable food environment and could be an important driver of the rising prevalence of obesity in Indonesia, from 15.4% in 2010 to 19.7% in 2013 (Center for Health Research and Development, 2010; Center for Health Research and Development, 2013). The prevalence of obesity was comparatively higher in urban than in

the rural areas, and among those with higher educational attainment, and higher expenditures (Center for Health Research and Development, 2010).

Jakarta is also known to be the city most connected to the internet, in Indonesia (PusKaKom & APJII, 2014), exposing its residents a sophisticated integrated food marketing system. Evidence that active food marketing is associated with promoting obesity indicates the need for measures to regulate it (Umberger *et al.*, 2014, Gustafson *et al.*, 2014; Moodie *et al.*, 2013).

At the household level, decisions on food purchasing are commonly made by the housewife, in her role as the household food provider. Her reasons for selection of food for the family are important (International Chamber of Commerce, 2012). Studies that examine how food marketing influences household food providers are lacking (Institute of Medicine, 2006). According to the Stimulus Response Theory, the link between food marketing exposure and food shopping, in an individual, could be explored by understanding the approval in the decision-making process (Sobur, 2003).

This study investigated the association between exposure and approval for marketing strategies among household food providers. Its findings could be useful in addressing the issue of obesity among adults in Indonesia.

MATERIALS AND METHODS

The study used a mixed methods approach, where a qualitative study was conducted to further explore findings obtained from a quantitative analysis. The quantitative study was the International Study of the Families and Food Survey, an online survey conducted by Deakin University in several countries including Indonesia in 2014. The survey

determined the association between food marketing exposure experienced by household food providers and their response to the marketing strategies. The qualitative study comprised an in-depth interview of informants in Jakarta, to understand their perceptions of food marketing exposure and their response to food marketing strategies, as well as to understand the reasons for their decisions.

Quantitative online survey

The 2014 International Study of the Families and Food Survey was an online survey conducted by Deakin University simultaneously in Indonesia, Melbourne, Shanghai, Singapore and Vietnam. This study used only the data collected from the Indonesian respondents. The eligible respondents were women aged 19–49 years, married and were the primary household food providers. A total of 279 respondents who fulfilled the inclusion criteria was included in this analysis. This sample size was estimated to be sufficient, based on the minimum sample calculation to estimate exposure to food marketing with anticipated prevalence of 50%, an estimated deviation of 5% and an alpha of 95%.

Questionnaire point scale

The respondents were requested to provide information on their socio-demographic characteristics including age, educational attainment, marital status¹, and wealth status. They were also asked to complete a ten-item questionnaire on food marketing exposure, and a twelve-item questionnaire on approval/disapproval for food marketing strategies. For the food marketing exposure questionnaire, the respondents were asked to rate the

frequency of exposure in the past one month of each item on a 5-point scale. The lowest point (which was a score of 1) referred to zero exposure, while the highest score of 5 referred to ≥ 3 times exposure. For the questionnaire on approval of food marketing practices, participants were asked to rate their opinion of each item on a 5-point scale. The scores ranged from 1 to 5, where lowest score (1) meant “strongly disapprove” and highest (5) “strongly approve”.

Quantitative survey data analysis

All responses to the questionnaires were grouped using the exploratory factor analysis. Factor analysis was conducted using the principal component analysis with varimax rotation. Assumptions for the factor analysis were fulfilled with the Kaiser-Mayer-Olkin (KMO) > 0.5 and the significant result of Bartlett’s test of sphericity ($p < 0.01$) (Pett, Lackey & Sullivan, 2003).

Descriptive data were presented as frequencies and percentages. Logistic regression was conducted to assess the relationship between the categorical predictor variable (“exposure to active or passive marketing”) and the categorical outcome variable (“approval response to food marketing strategies”). Adjusted odds ratio (AOR) was computed after adjusting for the socio-demographic factors of the respondents. All statistical analyses were conducted using IBM Statistical Package for Social Sciences (SPSS) software version 20.0.0.

Qualitative study: in-depth interview

Selection of informants

The principal investigator assisted by a research assistant, conducted the interviews with 16 informants enrolled

¹ number of electronic communication (e.g., smartphones, tablets, and computers) and entertainment devices (e.g., TVs, DVD players, games, etc.) in their households as indicator of wealth (Worsley *et al.*, 2017)

in the study. The informants were the main household food providers. The first informant was selected based on the inclusion criteria, while the remaining ones were selected via the snowball sampling technique.

The number of informants was defined by the study objectives, the variation of information that was essential, and the saturation of answers given by the informants. The important variables for the selection of the subjects considered to yield maximum variation of responses in this study were their working status (working vs housewife), the number of children (no children, or having children aged less than 5 years or older) and marketing exposure (low, medium and high) (Scully *et al.*, 2012; Sharma & Sonwaney, 2014; Devine *et al.*, 2009; Bianchi & Raley, 2005; Wang *et al.*, 2014). Marketing exposure was screened using the same questionnaire on food marketing exposure that was used in the on-line survey. Their answers were categorised as low exposure (not exposed to any channel of marketing media in the past one month), medium exposure (on 2-3 times exposure) and high exposure (> 4 times).

In-depth interview guide

The questions addressed perceptions about food marketing exposure and the responses were approval/disapproval. Prior to usage, the interview guide was pre-tested with two purposively chosen women in the area having characteristics that were similar to the informants recruited for the interview. The pre-testing was done to clarify issues that related to the flow of the questions, the approach to take in posing certain questions, to know whether the questions could gather the data we wanted to address, and to ascertain the tools that were needed to stimulate the help of informants in data collection. The questions of the in-

depth interview allowed informants to relate their experiences and perceptions pertaining to the topics in question. Two informants were interviewed each day and each interview lasted 60–90 mins. The research assistant audio recorded and transcribed the answers verbatim for analysis. Overall quality assurance was conducted by (1) ensuring questionnaire understanding by pre-testing, (2) having standardised data collection using guidelines and pictures to stimulate the informant's answers, (3) ensuring that all informants were interviewed by the same researcher assisted by the same research assistant, (4) making field notes and on-field analysis immediately after each interview.

In-depth interview analysis

At the end of the interviews, the responses were transcribed verbatim, and themes were extracted. The informants were differentiated based on the variations to provide a clear pattern. Finally, the findings of the quantitative study were compared with those of the qualitative study (Thomas *et al.*, 2015). All of the processes were documented using Microsoft Word and Microsoft Excel.

Ethical approval and letter of permission

Permission was obtained from the principal investigator of the 2014 International Study of the Families and Food Survey online survey. The ethical committee of the Faculty of Medicine, University of Indonesia gave approval for the present study (approval no. 068/UN2.F1/ETIK/2015), which was conducted from 7 December 2015 to 7 December 2016. Additional approvals were given by the Provincial government of Daerah Khusus Ibukota (DKI) Jakarta and the Ministry of Internal Affairs for the conduct of the study in Jakarta and its surrounding areas.

RESULTS

Socio-demographic characteristics

Quantitative online survey respondents

The main inclusion criteria for the online quantitative survey was that the respondents had to be the main decision makers who were responsible for planning and procuring food provisions for the family. Out of 279 respondents from Indonesia, the majority were married (90.7%) aged 30-49 years (74.2%) and with university education (93.5%) (Table 1). Among those with children, about half (54.5%) had children < 5 years old, while about

half (50.5%) had children aged \geq 5 years old. Most of the respondents (83.9%) were responsible for preparing the main meals for the family. As for household economic status, 26.2% were in the low category, while 39.1% and 34.8% were in the medium and high categories, respectively.

In-depth interview informants

The informants ($n=16$) were demographically similar to the on-line survey respondents. Like the latter, the informants were recruited because they were the main household food providers

Table 1. Socioeconomic characteristic of the online participants ($N=279$)

Characteristics	n (%)
Age (years)	
19-29	72 (25.8)
30-49	207 (74.2)
Marital Status	
Not married (separated/divorced/widowed)	26 (9.3)
Married	253 (90.7)
Educational Background	
High school or lower	18 (6.5)
University	261 (93.5)
Have children	
Yes	226 (81)
No	53 (19)
Have children aged below 5 years	
Yes	152 (54.5)
No	127 (45.5)
Have children aged 5 years and above	
Yes	141 (50.5)
No	138 (49.5)
Economic status [†]	
Low	73 (26.2)
Medium	109 (39.1)
High	97 (34.8)
Person who prepares the main meals in household	
Respondent	234 (83.9)
Respondent's partner/spouse	20 (7.2)
Servant/cook	15 (5.4)
Others	10 (3.6)

[†]Number of electronic communication (e.g., smartphones, tablets, and computers) and entertainment devices (e.g., TVs, DVD players, games, etc.) in their households as indicator of wealth (Worsley *et al.*, 2017)

Table 2. Distribution of the online respondents (%) according to frequency of active and passive marketing exposure in the past one month (N=279)

<i>Marketing exposure[†]</i>	<i>None</i>			<i>Cronbach's alpha</i>
	<i>1-2 times</i>	<i>> 3 times</i>	<i>%</i>	
Exposure to active marketing				0.805
Exposure to media				
On public transport (e.g. bus, train)	47.3	34.4	18.3	
In school (e.g. canteen, sports event)	53.0	33.7	13.3	
Magazines and other print materials	34.8	45.9	19.4	
Messages received via SMS	46.6	36.2	17.2	
Messages received via e-mail	46.6	26.9	26.5	
Exposure to passive marketing				0.701
Exposure to supermarket-related promotion				
Joining competition that was promoted on food or drinking packaging	68.1	27.6	4.3	
Playing game on the internet that was associated with a food or drink product	65.9	28.3	5.7	
Buying food/drinks from vending machines	63.1	32.3	4.7	
Buying extra food/drink products on display at the supermarket check-out counter	29.0	52.0	19.0	
Receiving free samples of a food/drink product at train station/shopping centre/supermarket	49.1	42.3	8.6	

[†]Factor analysis of the quantitative online survey response generated two factors, namely exposure to active marketing and exposure to passive marketing

and aged 19-49 years. All the informants had university education. Out of 12 informants with children, five of them had children < 5 years old, while seven had children aged \geq 5 years old. All the informants had experienced marketing promotion/advertisements in the past one month, with the majority (75.0%) reporting medium exposure (2-3 times exposure to food product advertisements in the past month).

Factor analysis of quantitative survey response

Food marketing exposure

Results of the factor analysis generated two factors on food marketing exposure. These factors were labelled based on their components, namely (i) exposure to active marketing, consisting of exposure to marketing media from public transport, at school, in a magazine, messages received via short messaging services (SMS) and via electronic mail (e-mail), and (ii) exposure to passive marketing, e.g. competitions promoting food or drinks, internet games associated with food or drink products, food/drink vending machines, supermarket displays at check-out counters and free samples of food/drink products at train stations/shopping centres. Reliability of these indices were good, with Cronbach's alpha ranging from 0.70-0.81.

In general, almost half of the respondents reported not having exposure to active marketing in the past month, whereas approximately one-third experienced such exposure 1-2 times, particularly in magazines and other print materials (Table 2). Receiving food advertising information via e-mails > 3 times in the past month ranked highest (26.5%) among the active marketing items that the respondents were frequently exposed to.

As for exposure to passive marketing, Table 2 shows that, in general, more

than half of the respondents were not exposed to such marketing practices in the past month. It is noted that "buying additional food or drink product at the check-out counter" was reported 1-2 times and > 3 times in the past month by 52.0% and 19.0% of the respondents, respectively. Exposure to competitions and games promoted on food products and the internet was not widely reported by the respondents.

Marketing strategies

Two factors were revealed in the factor analysis on food marketing strategies. These were: (i) the marketing of fast foods and foods high in sugar. These consisted of advertising of foods and drinks with high sugar on television/radio, the promotion of confectioneries/soft drinks in supermarkets, and two-for-one pricing/upsizing of fast foods and drinks; (ii) the marketing of healthy foods, consisting of marketing of fresh meat, promotion of water to children, and the marketing of fruit and vegetables. The responses to all the questions in each category were then made into an index by averaging the response scales. Reliability of the indices was good with Cronbach's alpha ranging from 0.69-0.84.

Table 3 shows that most of the respondents disapproved the marketing of fast foods and foods with high sugar content. The highest disapproval was for placing vending machines that carried such foods in schools (69.9%), followed by advertising foods and drinks containing high sugar on television/radio (66.3%). Nutrition education in schools or on television provided by soft drinks/fast food companies was not as widely disapproved (13.6%); in fact they were given approval by more than half of the respondents (64.5%). The majority of the respondents approved the marketing of healthy foods, especially promotion of

Table 3. Distribution of the online respondents (%) according to respondent approval/disapproval of marketing strategies (N=279)

Marketing strategies [†]	%			Cronbach's alpha
	Disapprove	Neither approve nor disapprove	Approve	
Marketing of fast food and foods with high sugar content (unhealthy foods)				0.839
Advertising of foods and drinks that contain high sugar on TV/ radio	66.3	26.2	7.5	
Promotion of confectionery/ soft drinks in supermarkets	19.0	47.0	34.1	
Two-for-one pricing/upsizing of fast foods and drinks	36.9	38.4	24.7	
Vending machines (with sugar sweetened beverages/confectionery) in schools	69.9	22.2	7.9	
Soft drink advertising that targets children	63.1	22.6	14.3	
Positioning of fast food outlets near schools	52.3	31.2	16.5	
Fast food companies' sponsorship of children's websites	53.0	32.3	14.7	
Fast food companies' sponsorship of children's sports/educational programmes	39.1	37.3	23.7	
Nutrition education in schools or on TV provided by soft drink/ fast food companies	13.6	21.9	64.5	
Marketing of healthy foods				0.693
Marketing of fresh meat	1.4	12.9	85.7	
Promotion of water to children	0.4	3.6	96.1	
Marketing of fruit and vegetables	0.7	5.0	94.3	

[†]Factor analysis of the quantitative online survey response generated two factors, namely marketing of unhealthy foods and marketing of healthy foods

drinking water to children (96.1%) and the marketing of fruits and vegetables (94.3%).

In-depth interviews

Food marketing exposure

In general, several of the interview informants experienced exposure to active marketing, especially via social media including SMS blasts and e-mails. They felt disturbed by the intensive marketing exposures.

“I got a lot...I thought they were emergency messages. In fact, they were just promotions. The pop-up advertisements on internet were also disturbing when I browse for something” (Working mother with < 5 years old child, frequent exposure)

The informants mentioned that ironically, exposure to passive marketing stimulated a greater desire to buy than exposure to active marketing, because they were directly faced with the products. Half of the informants (n=8) mentioned that products displayed near the cashier increased their desire to make purchases. Passive marketing exposure that involved competitions and free food samples also encouraged purchasing.

“Giving a tester (also known as received free-food-sample) and promotion in a competition is a direct promotion for reaching consumers. It was good because I could directly try it. The tester sells the taste not merely the image” (Housewife with no children, low exposure)

Marketing strategies

The most common reason for disapproving marketing strategies was when they affected health, the social life of children, and the school environment.

The ‘Health’ theme emerged particularly among informants with children aged < 5 years old, housewives, and those whose husband suffered from a disease. Informants with older children (> 5 years old) expressed more concerns about the negative effects brought about by marketing efforts in the school environment.

“I am afraid that all the unhealthy food drink marketing could easily brainwash children, and people with low education will be easily influenced without considering health effects” (Housewife with child > 5 years old, medium exposure)

“Environment has a big influence and we can’t control what the children consume outside the home. This kind of unhealthy outlets will make our children over-consume, especially foods high in fat, leading to obesity and heart attack. Schools should provide a healthy image, and permit the selling of only healthy products” (Housewife with child > 5 years old, medium exposure)

Meat and fruit were perceived as healthy but expensive foods.

“Prices of fruit and meat are quite expensive. If there are promotions for fruit and meat promotion, of course, it would stimulate people to buy. Since my husband got a heart attack, we prefer to eat home-cooked food, rather than eat outside. I make fresh mixed fruit-vegetables juice for him” (Housewife with child < 5 years old, husband suffered from heart attack)

The informants expressed concern for the freshness and quality of perishable foods such as meat and fruit.

“We have to be careful in choosing promotional meat or fruit. We need to be aware of meat’s quality and the freshness of the fruits and vegetables. Those which are on promotion tend to have low quality” (Housewife with child > 5 years old).

Most of the informants said that they realised the lure of marketing promotions but usually they kept to their purchasing to the needs of the family, which was also the most common reason for approving marketing strategies.

“I’d like to buy at the supermarket because there are so many promotions. However, it doesn’t mean that I buy all the products promoted. I buy because I need them, not because of the promotion. But if there is a promotion on things listed on my shopping list, then I buy” (Working mother with child < 5 years old, high exposure)

“I have had experience with promotions. If there was a promotion which said, “Buy 500 g and get 500 g free”, I will buy the item, even though I only needed 300 g. But I bought 500 g so that I could keep the rest of it for future use” (Housewife with < 5 years-old child, medium exposure)

Informants generally approved nutrition education provided by soft drinks or fast foods companies as they felt consumers benefited from the nutrition information, and as long as the companies were not promoting their products.

“It was a really brilliant idea of marketing through education. People take the benefit of the information. However, there would be a misunderstanding especially if the company also gave out samples of the products. The education itself

was good, but the food provided by promoter was not” (Housewife with < 5 years-old child, high exposure)

The preferences of the family, especially that of the children, were the driving factor for making purchases of the family food provisions. Informants with children > 5 years old, mentioned that their children’s preferences were influenced by social media, SMS blasts, and friends.

“She (informant’s daughter) usually has many messages from SMS blasts, offering items such as buy six donuts get six more for free. I usually ignore the messages because it’s quite disturbing. Anyway, I sometimes follow what she wants when we go out, but not too often because buying items such as donuts will make her fat” (Housewife with > 5 years-old child, medium exposure)

The informants also realised that advanced technology is emerging in Indonesia and that it could influence family preferences.

“Go Food® which charges only 10.000 for each delivery, helps us when there is no food at home or no time to buy. There are also many recommended restaurants that use their delivery service. This facility is the best option for food purchases, in situations such as traffic jam, on a rainy days and if we are too lazy to go out” (Working mother with no children)

Logistic regression of quantitative survey response

Results from the logistic regression analysis of the online survey data showed that exposure to marketing, whether active or passive, had an influence on the respondents’ approval of the marketing strategies. Respondents who were

Table 4. Logistic regression analysis of the online respondent approval for marketing strategies according to exposure to active or passive marketing (N=279)

Dependent variable	n (%)	Approval for marketing of unhealthy foods		Approval for marketing of healthy foods		Approval of industry-sponsored children education activities	
		p	AOR†(95% CI)	p	AOR (95% CI)	p	AOR (95% CI)
Exposure from passive marketing							
Not in last month	137 (49.1)		1		1		1
At least once in last month	142 (50.9)	0.375	1.32 (0.72-2.43)	0.152	0.52 (0.21-1.28)	0.963	1.01 (0.58-1.75)
Exposure from active marketing							
Not in the last month	183 (65.6)		1		1		1
At least once in last month	96 (34.4)	0.030	1.99 (1.07-3.73)	0.322	1.62 (0.62-4.21)	0.021	2.02 (1.11-3.69)

†AOR (95% confidential interval): Adjusted odds ratio computed after adjusting for socio-demographic characteristics of the respondents, namely age, marital status, educational background, having children, having children below 5 years, having children above 5 years and wealth status

exposed to active marketing at least once in the month prior to the survey, were 1.99 times more likely (AOR; 95% CI: 1.07-3.73) to approve marketing of unhealthy foods (Table 4). This category of respondents was also more likely to approve marketing of healthy foods (AOR: 1.62; 95% CI: 0.62-4.21) and industry-sponsored children nutrition education (AOR: 2.02; 95% CI: 1.11-3.69). In contrast, the respondents who were exposed to passive marketing were unlikely to approve the marketing of healthy foods or nutrition education for children by industry, compared to those who had no exposure at all.

DISCUSSION

The majority of respondents to the online survey were from Jakarta, had university education, and were categorised as having middle to high economic status. Rising income in Indonesia has been shown to be associated with changing dietary habits towards the increasing consumption of processed food products (Dyck, Woolverton & Rangkuti, 2012), especially in urban populations (Hawkes, 2007; Dyck *et al.*, 2012; Umberger *et al.*, 2014), owing to the need to save time, or because of convenience, variety, and pleasure (Agriculture & Agri-Food Canada, 2014).

The quantitative survey showed that active food marketing exposure was significantly associated with the approval of unhealthy food ($p=0.030$), as well as for the approval of industry-sponsored educational activities for children ($p=0.021$). Marketing increases the appeal of products to consumers, and processed food are among the most actively marketed products (Umberger *et al.*, 2014; Phipps *et al.*, 2014; Scully *et al.*, 2012; Bernhardt *et al.*, 2013; Lesser, Zimmerman & Cohen, 2013; Boyland *et al.*, 2011; Harris *et al.*, 2009). The informants of the in-depth interview said

that they bought additional promotional food products only when they thought that the family needed it.

While the online survey respondents received a high number of marketing exposures from emails, the qualitative study informants stated that they were exposed to marketing via the social media and SMS blasts. The exposure to online marketing depends on the degree of intensity of internet usage. In Indonesia, the number of internet users increased from 5.9 million in 2014 to 7.4 million in 2015 (PusKaKom & APJII, 2014), indicating the rapidly rising marketing opportunities for businesses. Companies are able to communicate directly with consumers with little time or location barriers (Haghirian, Madlberger & Tanuskova, 2005). Both the online survey and qualitative study participants approved the marketing of healthy food including fruit and vegetables. Studies have shown that supermarkets and grocery stores that had advertisements of healthy foods did manage to influence customers towards making more purchases of such foods (Escaron *et al.*, 2013; Glanz, Bader & Iyer, 2012). Likewise, the informants in this study considered freshness and quality of perishable foods to be important.

Disapproval of the marketing of unhealthy foods, i.e. fast foods and high sugar content foods, was shown to be high among the survey respondents and the subjects of the interviews. The latter group with school-going children expressed concerns on the marketing of unhealthy foods nearby the school compound. Food companies are known to increasingly use integrated marketing campaigns to target children and youth since they are easily influenced, do not have enough knowledge to choose healthy foods, and because of their influence over family spending (WHO,

2013; Boyland *et al.*, 2011; Sharma & Sonwaney, 2014). Children in developing countries may be more vulnerable to food promotions as they are potentially less critical than children in developed countries (Hastings *et al.*, 2006). In Indonesia, students purchase food and drinks in and around the schools. This creates an unhealthy food environment that has implications for obesity (Handayani *et al.*, 2015).

Children's educational activities that are sponsored by the industry received approval from more than half of the respondents (64.5%), even when the activity was sponsored by soft drinks/fast foods companies. The informants assumed nutrition education would benefit children "as long as the soft drinks or fast foods company did not promote their products". This points to a low awareness about subtle unhealthy food marketing among Indonesian consumers. Sponsorships provided by food industry include the provision of research grants, support for the publication of paper, travel grants for the attendance of conferences and support of various educational activities (Nestle, 2001; Nestle, 2006; Ludwig & Nestle, 2008). However, the benefits of such support remain debatable. A very strong opinion in an article in the *Lancet* from Moodie *et al.* (2013), stated that any support by suppliers of unhealthy foods for research, education and other programs should not be accepted. Nonetheless, given that sponsorships by food company is not going to disappear, the challenge lies in trying to control them rather than act to prevent them. It will be crucial to recognise potential conflicts of interest that may arise, take steps to minimize them, and keep public health at the forefront of professional activities (Nestle, 2001). However, in Indonesia, there are as yet no clear regulations, authoritative bodies or restrictions that

deal with the marketing and advertising practices, especially of food and beverages (Susyanty *et al.*, 2013). Given the findings of this study, public health authorities are urged to regulate food-marketing ethics, especially for foods that are targeted directly at children.

When addressing the influence of food marketing promotions, all interview informants emphasised the lure of promotion on their daily needs, especially promotion in the form of discounted products. Urban shoppers were interested in price reductions of healthy foods (Vukmirovic, 2015; Cohen & Babey, 2012; Glanz *et al.*, 2012). They took advantage of sales to stock up on essential items (Phipps *et al.*, 2014), and mentioned health considerations as the main factor for their decision for buying additional foods on promotion. This may indicate that price might not be a sensitive issue among highly educated people living urban areas. One explanation might be that consumers with higher education were more likely to have better knowledge of nutrition. Some studies have shown that in developed countries, the highly-educated were more likely to buy fruit and vegetables, while those with lower education attainment mentioned that price was more important than health and nutrition benefits (MacFarlane *et al.*, 2007; Ward *et al.*, 2012). Children with educated mothers had more healthy diets while children of the least educated consumed more foods that were convenient (Campbell *et al.*, 2002).

The strength of this study was the use of mixed methods that showed the association between exposure and approval of food marketing promotion among household food providers. Among the limitations is the reliance on self-reported questionnaires, that could have been affected by memory recalls. The findings of the online survey cannot be

generalised to the broader Indonesian population since the selected sample comprised respondents with university education and middle-high income.

CONCLUSION

The present study showed that, among university educated people living in an urban area, exposure to food marketing did influence their approval for marketing strategies including marketing of unhealthy foods. This has serious implications especially in regard to marketing efforts that are aimed at children and household food providers without knowledge of health and nutrition. There is an urgent need for efforts to regulate unhealthy food marketing. In addition, industry should act responsibly in their marketing efforts to consumers. The government should independently and objectively monitor these efforts. While this study was conducted in a highly educated urban population, future studies should be undertaken among consumers with lower socio-economic status, to gain insight on the impact of food marketing exposure in that segment of the population.

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Authors' contributions

SA, designed the current study and carried out qualitative data collection, analysed and interpreted the data, and developed the first draft of the manuscript; HK, designed the current study, interpreted the data, conduct re-analysis of the data, critically reviewed the first draft manuscript and drafting the subsequent draft of the manuscript until the current version; SB, designed the current study, interpreted the data, and critically reviewed the first draft manuscript; JF, involved in the online study of marketing exposures conducted by Centre for Physical Activity and Nutrition Research (Deakin University, Melbourne, Australia); AW lead the online study of marketing exposures conducted by Centre for Physical Activity and

Nutrition Research (Deakin University, Melbourne, Australia), and critically reviewed the manuscript. All authors have seen and approved the final manuscript.

Conflict of interest

The authors declare no conflict of interest.

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Association between food marketing exposure and consumption of confectioneries among pre-school children in Jakarta

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ABSTRACT

Introduction: Prevalence of obesity among pre-school children in Indonesia is increasing. Since food advertisements reach all age groups, this study was conducted to assess the association between food marketing exposure and children's consumption of confectioneries at home. **Methods:** Two hundred and forty caregivers of children aged 3-5 years attending 25 early childhood education centres in Central Jakarta, were interviewed in this cross-sectional study. A structured food frequency questionnaire was used to determine food marketing exposure and child dietary consumption. Chi-square tests compared consumption of confectioneries with different levels of marketing exposure. **Results:** Out of a total 240 caregivers, most were mothers of the study children (79.2%) and other family members (19.2%). The majority of the caregivers did not work (81.7%), and <15.0% had graduated from university, while 42.0% lived with extended family members. The top ten confectioneries consumed by the children included chocolate wafer crisp, chocolate stick and soft candy. Among the most common food marketing practices were as advertisements on public transport, print and electronic media. The significant associations between four food marketing practices and consumption of eight types of confectioneries were key findings of this study. Receiving food promotion through short message service (SMS) was not significantly associated with consumption of the top ten confectioneries. **Conclusion:** A positive association was found between food marketing practices and consumption of confectioneries by pre-school children in Central Jakarta. An appropriate policy on food advertisements that targets children combined with parental food education is recommended for improving food consumption habits of young children.

Keywords: Dietary consumption, food marketing, preschoolers, sugar and confectionery products, Indonesia

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INTRODUCTION

The prevalence of overweight and obesity among children worldwide has increased in the past two decades. The World Health Organization (WHO) stated that in 2013, the number of overweight children who were < 5 years of age was estimated to be over 42 million globally. Many were from developing countries (WHO, 2016a). De Onis, Blossner & Borghi (2010) described an increasing trend of overweight-obesity prevalence among pre-school children that accounted for 3.2% in 1990, 4.9% in 2010, and is estimated will be 6.8% in 2020 in Asia alone. The Indonesian Basic Health Research (*Riskesdas*) has revealed a similar trend of increasing prevalence of overweight among under-fives from 3.9% in 2007 to 5.1% in 2013 (NIHRD, 2013). Childhood obesity is a strong predictor of obesity in adulthood. WHO (2016b) and Gatineau & Mathrani (2011) have noted that the consequences of childhood obesity include non-communicable diseases (NCDs), such as type 2 diabetes, cardiovascular diseases, metabolic syndrome, osteoarthritis and cancer in young adulthood.

Current social environment unconsciously encourages weight gain and obesity among children. The WHO (2016b) reported of changes in food availability and types, and decline in physical activity in terms of transport and playing among children, lead to energy imbalances. Whiney & Rolfes (2008) showed that children live in environments that expose them to an abundance of high-calorie and high-fat foods that are readily available, relatively inexpensive, heavily advertised, and reasonably tasty. This situation is described as being in an 'obesogenic environment' (Swinburn, Egger & Raza, 1999).

Obesity in children is increasing due to their preferences for foods such as instant foods that are energy-dense, high

in fat and sugars but low in vitamins, minerals and other micronutrients (WHO, 2016c; de Lira-Garcia, Bacardi-Gascon & Jiménez-Cruz, 2012). Research suggests that children naturally prefer sweet and savory foods and generally reject sour and bitter tastes. Taste preferences are developed from early childhood experience and through repeated exposures (Liem, 2004). Children appear to prefer foods that are energy dense due to their high sugar and fat contents (Brown *et al.*, 2011). Over consumption of foods which are energy dense but poor in micronutrient content contribute to child adiposity (Zhou & Zhang, 2014). The high consumption of sugar-sweetened beverages has been associated with obesity as a result of the replacement of more nutrient dense foods. High sugar consumption also adversely affects dental health (Scafida & Chambers, 2017).

The foods that are considered confectioneries are candy, syrup, chocolate, chocolate chip/morsel, jelly, gelatin, and honey (Siswanto, 2014). Sweet, salty and high fat content foods are included in many widely advertised foods (Kelly *et al.*, 2010). According to Worsley & Ridley (2014), exposure to food marketing is defined as the frequency that one sees food advertisements in a period of time. These include special offers, competitions, and giveaways of food/drink products. The high intake of energy dense food among children has been shown to be stimulated by food advertisements through television, the Internet, promotional campaigns and retail environments (Sonntag *et al.*, 2015).

Young children are more susceptible to the effects of marketing than adults (Story & French, 2004). Child-directed advertisements are more likely to feature appeals of fun, taste, humor, fantasy, action/adventure, desirability, and mystery (Edmund *et al.*, 2015). Marketers

target children, in part, because of their 'pester power' and subsequent influence on food purchases by the family (Pettigrew & Roberts, 2007). Children are also direct consumers (Sharma & Dasgupta, 2009). "Children's desires" (e.g. food likes) and health needs were among the top motives in the selection of foods and drinks by parents for their children (Russell, Worsley & Liem, 2014; Rigo *et al.*, 2018).

There is a lack of studies in Indonesia on food marketing exposure and dietary consumption of young children. The capital city, Jakarta provides an appropriate setting for investigating the role of food marketing exposure as children are frequently exposed to the high volume of food advertisements in the city. The aim of this study is to determine the association between food marketing exposure and consumption of confectioneries among pre-school children in Central Jakarta.

MATERIALS AND METHODS

Study design and sampling procedure

This cross-sectional study was conducted in Jakarta in May 2017. The respondents were caregivers of pre-school children, with apparently healthy children aged 3-5 years, who attended pre-school in Central Jakarta. Children and/or caregivers who had physical disability or suffered from serious illness were excluded. The sample size needed was 240 children. This figure was calculated based on an estimate of 45% of children exposed to food advertising (Harris, Bargh & Brownell, 2009) with 95% confidence interval, 10% absolute precision, and a design effect of 2.5 to anticipate the variations between the centres/schools as the sampling unit. Out of a total of 321 centres/schools that provided early childhood education for children aged 3-5 years across eight sub-districts in Central Jakarta

(Ministry of Education and Culture, 2017), 25 were randomly selected, using a software called ENA for Smart version 2011 (Nutrisurvey, Germany). The data from the online source consisted of the number and name of the centres/schools, address and whether they were private or national (government owned) schools.

Before conducting the study, the researcher visited the selected centres/schools, and explained to the headmaster/principal the purpose of the study and the criteria for the selection of the respondents and their children. Children who appeared healthy and aged 3-5 years were included in the study. The number of eligible children who were included in the study was between 11-15 per centre/school. None of the respondents screened was excluded. Informed consent was obtained from the respondents before the interview.

Instrument development and data collection procedure

Data collected included the:

- (i) frequency intake of confectioneries at home among the children, using a structured Food Frequency Questionnaire (FFQ);
- (ii) demographic characteristics of the family such as child's sex, respondent's educational background, occupation, household socioeconomic status obtained from possession of assets and housing condition.
- (iii) frequency of the food marketing exposure of the respondent and/or the child by way of special offers, competitions, or giveaway food/drink products in the past week through various media (television, game-internet, short message service blast, billboards, school competitions, magazines, supermarket toys, etc.), as adapted from Worsley & Ridley (2014).

The list of confectioneries used in this study FFQ was adapted from the Indonesian Total Diet Survey (TDS) by Siswanto (2014). The confectioneries included were candy, syrup, chocolate, chocolate chip/morsel, jelly, gelatin, and honey (Siswanto, 2014). These types of confectioneries were commonly seen advertised in various media outlets such as television, internet based social media i.e. e-mail, Facebook® and Instagram®, short message service (SMS), on transportation vehicles, print media i.e. brochures, flyers, etc., which were sold in the market places such as street stall/kiosks, mini market, supermarket, fast food restaurants. The researchers conducted observations in nearby markets, stalls, small shops, traditional markets, and other food retailers, to further verify that these confectioneries were available on the premises of the study. The final list of confectioneries used is shown in Table 2. In addition, a booklet containing photographs of the confectioneries listed in the FFQ was used to assist the respondents in recalling which confectioneries their children had consumed in the past one month.

The FFQ and other questionnaires were pretested before data collection. The interview was conducted after school hours when the caregivers picked up their children from school.

Data analysis

The data was analysed using SPSS version 20 for univariate and bivariate analysis with 95% confidence interval. Household socioeconomic status was defined as 1st – 3rd tertiles obtained from making a composite variable based on household assets and housing condition. The frequency of food consumption was defined as 'ever consumed in the last month' by the children. A total of 26 confectionery categories was included in the FFQ, and the response was arranged

from the most frequently consumed confectionery by the children to the least frequently consumed. Only the top ten commonly consumed products were included in the bivariate analysis.

The types of food marketing exposures in this study were categorized into (i) exposure from the media, and (ii) exposure from supermarket related promotion, based on Avianty (2016). Exposure from the media consisted of advertisements (i) seen on public transport, (ii) seen in a magazine/newspaper, (iii) received via email, social media, television, (iv) seen at school, and (v) received via SMS. Meanwhile food marketing exposure from supermarket-related promotions included (i) food or drinks purchased from vending machines, (ii) buying extra food or drinks on display at the supermarket checkout, (iii) receiving free food/drink sample at the train station, shopping centres, supermarket, etc., (iv) playing a game or entering a competition in the internet, and (v) entering a competition seen on food or drink packaging.

Out of these ten types of exposure, only the top five highest responses that were recorded in this study were entered in the bivariate analysis. The chi-square test was used to assess the association between the types of food marketing exposure with consumption of commonly consumed confectioneries.

Ethical consideration

This research proposal was approved by the Health Research Ethics Committee of the Faculty of Medicine, of Universitas Indonesia (approval number 342/UN2.FI/ETIK/2017). Written informed consent was obtained from each participant prior to data collection.

RESULTS

Out of a total of 240 respondents in the study, nearly 80.0% were mothers of the

Table 1. General characteristics of the respondents (n=240)

<i>Variable</i>	<i>n (%)</i>
Child	
Boys	121 (50.4)
Girls	119 (49.6)
Respondent's relationship with children	
Mother	190 (79.2)
Other family members	46 (19.2)
Paid caregiver	4 (1.6)
Age of respondent (years)	
≤ 20	5 (2.1)
21-30	80 (33.3)
≥ 31	155 (64.6)
Highest education level of respondent	
Below elementary school	2 (0.8)
Elementary school	33 (13.8)
Junior high school	59 (24.6)
Senior high School	111 (46.3)
University	35 (14.6)
Occupation of respondent	
Working	44 (18.3)
Non-working	196 (81.7)
Wealth index of family	
1 st tertile	89 (37.1)
2 nd tertile	89 (37.1)
3 rd tertile	62 (25.8)
Type of family	
Nuclear	140 (58.3)
Extended	100 (41.7)

children. Less than 15.0% of them had graduated from university and 81.7% had no paid work outside the home. The majority of the households were from the poorer socioeconomic group. About 40.0% of the respondents lived with their extended family (Table 1).

Twenty-six confectionery categories were included in this study (Table 2). The top ten most consumed types of confectioneries included candy, chocolate, crackers, and ice cream. The most popular confectioneries are ranked in Table 3.

The five most common food marketing practices experienced by the respondents and/or their respective children were (i) receiving advertisements promoting food products via email,

social media, television (56.7%), (ii) buying additional food or drink product on display at the supermarket checkout (55.8%), (iii) promotion in a magazine, newspaper or periodical (47.1%), (iv) advertisements on public transport such as buses and trains (35.4%), and (v) via SMS (29.2%). Of all ten types of food marketing practices, five types were less common (only exposing <15.0% of the respondents and/or the child). Those practices were marketing at school, through vending machines, free sample giveaways, playing a game on the internet, and entering a competition based on food packaging (Table 4).

The association between the five most common food marketing practices and ten most commonly

Table 2. List of confectioneries listed in the FFQ

<i>Biscuits/cakes</i>	<i>Candy</i>	<i>Chocolate/wafer</i>	<i>Jelly/pudding</i>	<i>Ice cream</i>
1) Better crackers with cream and chocolate coated	5) Big Babol bubble gum	13) Beng-Beng wafer crisp covered with chocolate	20) Milna toddler pudding	22) Campina ice cream
2) Better soft cake	6) Chupachups candy stick	14) Cha-cha choco biscuit candy	21) Okky jelly drink	23) Aice corn ice cream
3) Gerry choco roll crackers	7) Hot hot pop candy stick	15) Choki-choki chocolate stick		24) Magnum Classic ice cream
4) Momogi biscuit choco filling	8) Kiss candy	16) Chunky chocolate bar		25) Paddle Pop ice cream
	9) Mentos candy	17) Kinderjoy chocolate candy		26) Walls ice cream cup
	10) Milkita milk lollipop	18) KitKat wafer chocolate bar		
	11) Relaxa candy	19) Silverqueen chocolate bar		
	12) Yupi soft candy			

consumed confectioneries is presented in Table 5. Food marketing exposure to magazines, newspapers and other print media was significantly associated with the consumption of the top six confectioneries, namely, Beng-beng, Choki-choki, Yupi, Milkita, Silverqueen, and Hot hot pop. This was followed by food marketing through e-mails, social media, and television which were associated with consumption of four of the confectioneries, namely, Yupi, Cha-cha, Milkita, and Silverqueen. Food advertisement on public transport and supermarket displays were each associated with two products, namely Beng-beng and Walls, and, Cha-cha and Silverqueen, respectively. Most of the confectioneries were associated with more than one marketing practice. In contrast, receiving promotion through SMS was the only marketing practice that was not significantly associated with children's consumption of any of the top ten confectioneries.

Consumption of the confectioneries, Better and Kinderjoy, was not found to show significant association with any of the food marketing practices.

DISCUSSION

This study identified the top ten confectioneries consumed by pre-school children in Jakarta. The five most common food marketing practices were also found to have significant association with the consumption of several of the popular types of confectioneries. The present findings concur with reports of food marketing that targets young children (Huang, Mehta & Wong, 2011; Kelly *et al.*, 2010; Sonntag *et al.*, 2015). The caregivers and/or the children identified candy and chocolate wafer products through exposure to more than one type of marketing promotion technique. Children are fond of sweet foods and this preference may have been inculcated from an early age through

Table 3. Confectioneries consumed at least once during in the past one month (n=240)

No.	Food product	n	%
1.	Beng-Beng wafer crisp covered with chocolate	138	57.5
2.	Choki-choki chocolate stick	116	48.3
3.	Yupi soft candy	105	43.8
4.	Better crackers with cream and chocolate coated	101	42.1
5.	Kinderjoy chocolate candy	75	31.3
6.	Chacha biscuit choco ball	68	28.9
7.	Milkita milk lollipop	55	22.9
8.	Silverqueen (chocolate)	48	20.0
9.	Hot hot pop stick candy	32	13.3
10.	Walls ice cream cup	25	10.4
11.	Big Babol bubble gum	24	10.0
12.	Magnum classic ice cream	24	10.0
13.	Kitkat wafer chocolate bar	20	8.3
14.	Okky jelly drink	11	4.6
15.	Campina ice cream	8	3.0
16.	ChupaChups candy stick	8	3.4
17.	Momogi biscuit choco filling	7	2.9
18.	Gerry choco roll crackers	7	2.9
19.	Paddle pop ice cream	6	2.5
20.	Aice corn ice cream	4	1.6
21.	Milna toddler pudding	3	1.2
22.	Chunky chocolate bar	1	0.4
23.	Mentos candy	1	0.4
24.	Kiss candy	1	0.4
25.	Better soft cake	1	0.4
26.	Relaxa candy	1	0.4

repeated exposures (Liem, 2004). The present study found that multiple food marketing techniques could potentially intensify a child's taste preference. Advertisements with fun appeal and those which were adventure-driven were more likely to capture the attention of children (Edmund *et al.*, 2015). The potential influence of children on their parents in making purchases is the aim of marketers in targeting children (Pettigrew & Roberts, 2007; Sharma & Dasgupta, 2009). Marketing practices also target parents or caregivers as they have the responsibility for purchasing for their children (Edmund *et al.*, 2015).

Previous studies have reported the intensive use of television for marketing

various food products (Huang, Mehta & Wong, 2011; Kelly *et al.*, 2010), as the television affords access to children at much earlier ages than other media (Ali *et al.*, 2012). In contrast, the present study found that the print media, including magazines and newspapers, were associated with the consumption of confectioneries that were highly preferred by the pre-school children. Byrum (2014) has suggested that the printed media such as flyers, brochures, newspapers and magazines may have a stronger impact on brand awareness compared to television.

A strength of this study is that the types of confectioneries listed in the FFQ incorporates a review on the

Table 4. Marketing practices as experienced at least once by the respondents and/or children in the previous week (n=240)

<i>Food marketing practices</i>	<i>n (%)</i>
Exposure from media	
On public transport (e.g. bus, train)	85 (35.4)
In a magazine, newspaper, printed media	113 (47.1)
Received via email, social media, television	136 (56.7)
At school (e.g. canteen, sports event) [†]	30 (12.5)
Received via SMS	70 (29.2)
Exposure from supermarket related promotions	
Buy food or drinks from a vending machine [†]	29 (12.1)
Buy an extra food or drink product on display at the supermarket checkout	134 (55.8)
Receive a free sample of a food or drink product at a train station, shopping centre, supermarket [†]	36 (15.0)
Play a game or enter a competition on the internet that was related to a food or drink product [†]	6 (2.5)
Enter a competition you saw on food or drink packaging [†]	5 (2.1)

[†]Excluded later in bivariate analysis

marketing mode used by the food producers, as well as the availability of these products in the local market places. In this way, the confectioneries are those that are and widely sold and commonly consumed by the children in the study setting. Indonesia is considered the largest foodservice market among ASEAN countries (Chen, 2016). The top three growth drivers for Indonesia's foodservice market are full-service restaurants, fast foods and street stalls/kiosks. In urban areas like Jakarta, street stalls/kiosks and mini markets may be regarded the most popular foodservice outlets since they provide affordable products (Chen, 2016). About 56.0% of the respondents and/or their children were exposed to marketing associated with product displays at supermarket checkouts. Sonntag *et al.* (2015) reported that to forge a long-lasting relationship with children and create brand loyalty in the short and long run, the food industry uses persuasive marketing techniques,

such as providing attractive and emotional-appeal product packing, and using toys as giveaways.

Children are unable to understand the intent of the advertisements. Moreover, they cannot distinguish healthy and unhealthy foods by themselves (Story & French, 2004). Therefore, a restricted policy for food advertising that is targeted at children is one of the strategies strongly recommended for combating the double-burden of malnutrition and unhealthy food intake in Indonesia (World Bank Indonesia, 2012). In Indonesia, legislation on the restriction of food advertisement targeting children should be implemented and followed up with monitoring measures. Such a policy on food marketing should include internet based and social media platforms since they are able to reach children. In addition, food education for parents should focus on increasing their knowledge in providing a healthier food environment at home (Februhartanty & Khusun, 2018).

Table 5. Association between food marketing practices and consumption of confectioneries among pre-school children†

Sugar & confectionery products‡	Food Marketing Practices														
	On public transportation			In magazines, newspaper or other printed media			Received via email, social media, TV			Supermarket displays			Received via SMS		
	Ever n (%)	Never n (%)	p-value	Ever n (%)	Never n (%)	p-value	Ever n (%)	Never n (%)	p-value	Ever n (%)	Never n (%)	p-value	Ever n (%)	Never n (%)	p-value
Beng-Beng	59 (69.4)	79 (51.0)	0.006*	74 (65.5)	64 (50.4)	0.018*	83 (61.0)	55 (52.9)	0.206	83 (61.9)	55 (51.9)	0.118	47 (67.1)	91 (53.5)	0.052
Choki-choki	42 (49.4)	74 (47.7)	0.804	63 (55.8)	53 (41.7)	0.030*	73 (53.7)	43 (41.3)	0.058	70 (52.2)	46 (43.3)	0.173	37 (52.9)	79 (46.5)	0.369
Yupi	40 (47.1)	65 (41.9)	0.444	61 (54.0)	44 (34.6)	0.003*	72 (52.9)	33 (31.7)	0.001*	63 (47.0)	42 (39.6)	0.252	32 (45.7)	73 (42.9)	0.694
Better	42 (49.4)	59 (38.1)	0.089	49 (43.3)	52 (40.9)	0.705	62 (45.6)	39 (37.5)	0.208	61 (45.5)	40 (37.7)	0.225	34 (48.6)	67 (39.4)	0.191
Kinderjoy	28 (32.9)	47 (30.3)	0.676	36 (31.9)	39 (30.7)	0.848	45 (33.1)	30 (28.8)	0.482	43 (32.1)	32 (30.2)	0.752	23 (32.9)	52 (30.6)	0.730
Chacha	30 (35.3)	38 (24.5)	0.076	37 (32.7)	31 (24.4)	0.153	46 (33.8)	22 (21.2)	0.031*	48 (35.8)	20 (18.9)	0.004*	22 (31.4)	46 (27.1)	0.495
Milkita	26 (30.6)	29 (18.7)	0.036	37 (32.7)	18 (14.2)	0.001*	42 (30.9)	13 (12.5)	0.001*	33 (24.6)	22 (20.8)	0.478	16 (22.9)	39 (22.9)	0.369
Silverqueen	20 (23.5)	28 (18.1)	0.311	38 (26.5)	18 (14.2)	0.017*	34 (25.0)	14 (13.5)	0.027*	34 (25.4)	14 (13.2)	0.019*	17 (24.3)	31 (18.2)	0.287
Hot hot pop	12 (14.1)	20 (12.9)	0.791	21 (18.6)	11 (8.7)	0.024*	21 (15.4)	11 (10.6)	0.272	18 (1.34)	14 (13.2)	0.959	11 (15.7)	21 (12.4)	0.486
Walls Ice Cream Cup	17 (20.0)	8 (5.2)	0.000*	16 (14.2)	9 (7.1)	0.073	18 (13.2)	7 (6.7)	0.102	17 (12.7)	8 (7.5)	0.196	8 (11.4)	17 (10.0)	0.742

†Chi-square test

‡Top ten mostly consumed sugar and confectionery products

*p-value < 0.05

Limitations of study

In the present study, advertisements via e-mails, social media, and television were combined in the same category of marketing practice. Hence, the influence of these media individually could not be determined.

CONCLUSION

The study determined the association between popular food marketing practices and the consumption of confectioneries preferred by pre-school children in Jakarta. Policy restrictions of food advertisements that target children should be put in place. Providing education on healthier food choices to parents/care givers can contribute to the improvement of the home food environment for children.

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Authors' contributions

FMMY, contributed to the conception and design of the work, was involved in the acquisition and analysis of the data and compiled the first draft of the manuscript; FJ, contributed to the conception and design of the work, was involved in the acquisition and analysis of the data, the critical revision of the draft and approved the final draft; BS, contributed to the conception and design of the work, was involved in data interpretation, the critical revision of the draft and also approved the final draft.

Conflict of interest

All authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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Eating behaviour of young female workers with low socioeconomic status in Malang City, East Java: a qualitative study

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ABSTRACT

Introduction: Eating behaviour is one of the important factors affecting nutritional status that has been widely investigated. However, there are few studies on the eating behaviour of young female workers in Indonesia. This study aimed at investigating the factors affecting eating behaviour of young female workers of low socioeconomic status in Malang, East Java province, Indonesia. **Methods:** Participants were recruited using purposive sampling from low-income families living in Malang City. The eligibility criteria were based on demographic information, including monthly household income and expenses. The participants recruited comprised 21 women aged 18-22 years who were employed outside their homes, unmarried and living with their parents. A qualitative methodology was used to understand the meaning and context of the eating behaviour of these women. In-depth interviews and focus group discussions were used as the primary data collection methods. **Results:** Two primary themes emerged as the main influences of the participants' eating behaviour: individual attributes (food preferences, healthy eating knowledge and self-efficacy), and socio-environmental factors (peer influence, mother's role and food availability). In general, the participants had some knowledge about healthy eating behaviour; however, they lacked self-efficacy to practise such behaviour. **Conclusion:** Individual motivations and socio-environmental factors were found to mediate the eating behaviour of young working women from poor households. These factors should be considered when designing nutrition programmes for achieving healthier eating behaviour among young working women.

Keywords: Young female workers, eating behaviour, qualitative study, low socioeconomic status, Indonesia

INTRODUCTION

The literature review by Andreyeva *et al.* (2012) emphasised the importance of healthy eating among women of reproductive age, especially those who worked outside the home. Healthy eating

among working women can become a challenge owing to several socioeconomic and environmental factors, including lack of access to healthy foods and time constraints due to long working hours. Unhealthy eating leads to nutrient

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deficiencies. Women of reproductive age are particularly vulnerable to iron deficiency (Pala & Dundar, 2008). Underweight hinders productivity at work. In Asia, an estimated 20-40 per cent of women are underweight (WHO, 2010). Malnutrition in women leads to economic losses for not only the family but also the country.

Malnutrition among women is one of the major public health problems in Indonesia. Based on the Indonesian National Basic Health Research (*Riset Kesehatan Dasar* or *Riskesdas*), the prevalence rate of chronic energy deficiency in non-pregnant women of reproductive age was 13.6% in 2007 and 20.8% in 2013 (MOH RI 2007; MOH RI 2013). Riskesdas data in 2010 indicated that 40.7% and 37.4% of women of reproductive age (19-55 years) had energy and protein consumptions that were below the minimum requirements (MOH RI 2010). The prevalence rate of anaemia was 14.8% in 2007 and rose to 21.7% in 2013. According to World Health Organization (WHO) classification, this means that Indonesia is a country where anaemia is a moderate public health problem (WHO, 2011).

In order to develop effective strategies for the improvement of eating habits, it is important to identify the factors that influence eating behaviour. Various theories have been put forward to understand eating behaviour. The social-cognitive theory of Bandura is commonly used to support intervention programmes that promote healthy eating. The theory emphasises the interaction of three main factors that operate at the personal, behavioural and social levels, that can explain the health behaviours of people, including their eating habits (Bandura, 1989; Rinderknecht & Smith, 2004). The physical environment in which individuals interact in different settings is a critical force that may restrict or increase the motivation

of people towards making healthy eating decisions (Belon *et al.*, 2016). Investigation of eating behaviour and its determinants may give us a better understanding of how and why eating behaviour can be influenced. Based on these factors, prevention strategies and interventions can be established to improve eating habits, particularly among vulnerable individuals, such as young female workers. The present study was aimed at determining the social and environmental factors that affect the eating behaviour of working women.

MATERIALS AND METHODS

Participants were recruited using purposive sampling from low-income families living in Malang City. The eligibility criteria were based on demographic information: women aged 18-22 years who were working outside the home, unmarried, and living with their parents. During the screening, the researchers inquired about monthly household income and expenses, in order to confirm that the household belonged to the low economic status category (Nielsen, 2010). A total of 21 working women, aged 18-22 years, was recruited. The purpose of the study was explained to the participants, all of whom signed the informed consent form. They were requested to minimise changes in their eating behaviour during the study period.

A qualitative study design was used to collect information on the eating behaviour and associated beliefs of the informants. Focus group discussions (FGDs) followed by in-depth interviews were both utilized sequentially. Two FGD sessions involving six different participants in each discussion session were conducted (Figure 1). The purpose of the FGDs was to gather information on their daily living routine and typical eating habits.

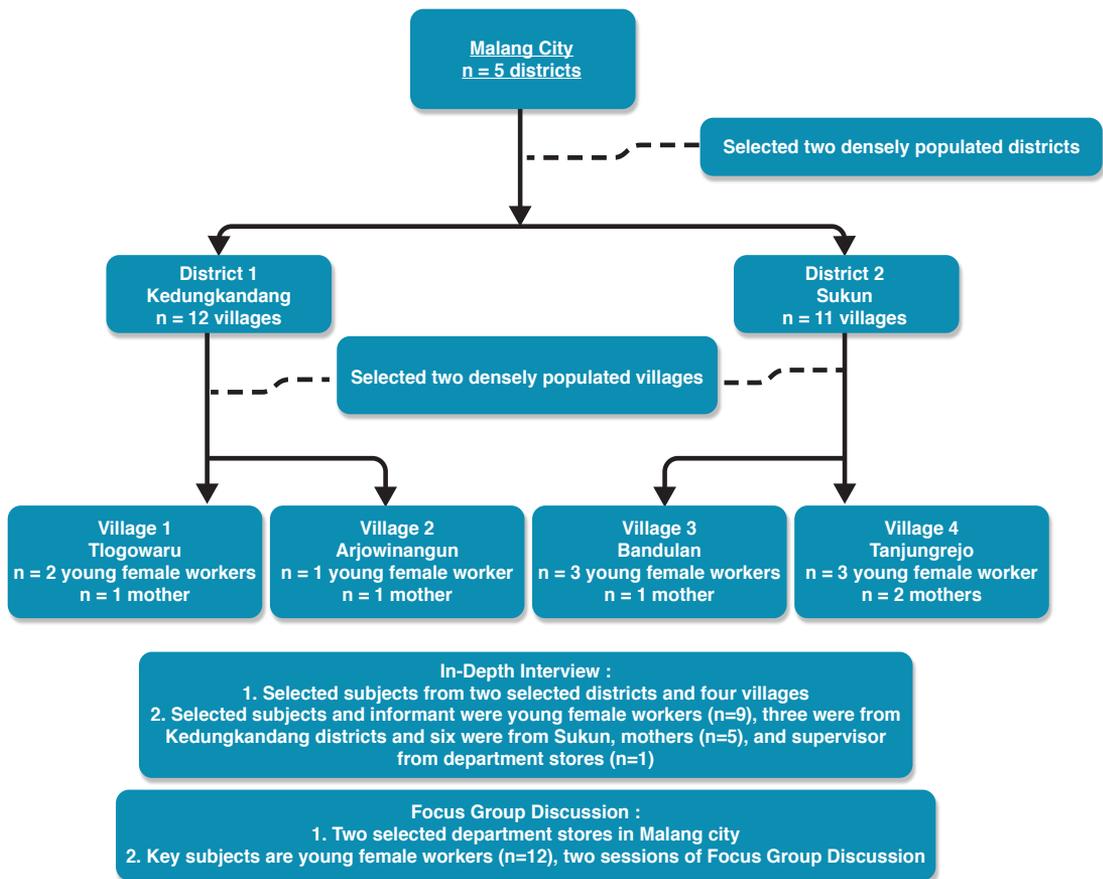


Figure 1. Protocol for the sampling for subjects

The FGDs and interviews were performed according to a prepared semi-structured question format (Table 1). A set of questions was used to guide the researchers during the interview. However, time was also provided for spontaneous questions on relevant topics that were not part of the interview questions. The guidelines for interviewing the female workers included topics related to their current eating behaviours, factors influencing their eating practices, and their perceptions about healthy eating. Meanwhile, the guidelines for the mothers of the female workers included topics related to the role of mothers in determining the eating behaviour of these women and their

perceptions about healthy eating. As for the job supervisors, a semi-structured interview was conducted where they were asked about regulations and employee programmes implemented at the workplace. Each FGD lasted about 40–50 minutes, whereas the in-depth interviews lasted for about 50–70 minutes. The topics serving as guidelines for the FGDs and in-depth interviews are shown in Table 1.

Ethical considerations

The study protocols were approved by the Institute of Research and Community Service, Universitas Katolik Indonesia, Atma Jaya (No. 772/III/LPPM-PM.10.08/15/2014).

Table 1. Topics for the focus group discussions and in-depth interviews

<i>Focus Group Discussion</i>	<i>In-Depth Interview</i>
Focus group discussions among female workers	In-depth interview of female workers
1. What are your favourite foods? Why do you like them?	1. Please describe your current daily eating patterns?
2. Who are the people who influence your daily eating?	2. What are the factors that influence your daily eating?
3. Where do you usually eat?	3. Do you like to eat out? If so, why?
4. What do you think about healthy eating?	4. What do you think about your own daily eating habits?
	5. What do you know about healthy eating?
	6. Do you think it is difficult to practise healthy eating? If so, why?
	In-depth interview of mothers of female workers
	1. Do you often eat together with your family?
	2. Do you give any information to your family about healthy eating?
	3. Do you think mothers should play an important role in informing their daughters about healthy eating? Could you elaborate on that?
	4. What do you think about your daughter's daily eating behaviour? Is it healthy enough?
	In-depth interview among job supervisors of female workers
	1. Based on your observation, where do the female workers have lunch?
	2. What do the female workers usually eat during lunch or during their break?
	3. Is there any nutrition education in your workplace?
	4. What do you think about the female workers' eating habits? Is it healthy enough?

Data analysis

Thematic content analysis was conducted to identify themes and patterns from the information that was collected. The primary steps were transcription of the audio information, generation of initial coding, search and review for themes (Braun & Clarke, 2006). The audio files of the participants who spoke in the Indonesian language during the interviews and FGDs were transcribed verbatim. The transcripts were examined several times before coding was carried out. Each phrase was provided with a code, and related codes

were categorised. Each category was assigned to one of the following primary themes: eating behaviour and factors associated with eating behaviour. The theme was coded using ATLAS.ti version 7 (Berlin, Germany). A summary of the participant's opinions was provided. The major and contrasting opinions were described and illustrated as quotes from the transcripts.

RESULTS

The socioeconomic characteristics of young female workers and their mothers

Table 2. Socioeconomic characteristics of young female workers and their mothers

<i>Characteristics</i>	<i>n</i>
In-depth interview	
Young female workers	9
Age (years)	
19	5
20	4
Father's education	
Elementary school	6
Junior high school	2
Senior high school	1
Mother's education	
Elementary school	6
Junior high school	2
Senior high school	1
Monthly household income [†]	
Rp 700,000–1,000,000	7
Rp 1,000,000–1,500,000	2
Mothers	5
Age (years)	
35–45	4
46–55	1
Level of education	
Elementary school	3
Junior high school	2
Occupation	
Working	3
Not working	2
Focus group discussion	12
Age (years)	
17.0-17.9	1
18.0-18.9	2
19.0-19.9	5
20.0 and above	4
Father's education	
Elementary school	6
Junior high school	1
Senior high school	5
Mother's education	
Elementary school	6
Junior high school	1
Senior high school	5
Monthly household income [†]	
Rp 700,000–1,000,000	5
Rp 1,000,000–1,500,000	7

[†]Low socioeconomic strata with monthly household expenses ranging from Rp 700.000 to Rp 2.000.000 based on Nielsen's classification (Nielsen, 2010); Rp 14,000 = USD 1

are presented in Table 2. Based on observations, numerous food stalls were available in the living areas of the participants. These street vendors typically sell deep fat fried and calorie-dense foods. These nutrient-poor foods are appealing to the working women, especially when they did not bring home-cooked meals to work, and thus depended on street food. Local dishes were the typical foods that were frequently consumed. These included *bakso* (savoury meatball soup with noodles), fritters and *cilok* (boiled starchy balls) coupled with *sambal* (a spicy condiment made of pounded chilli). A majority of the working women liked spicy foods, and they often added *sambal* to increase the flavour of the food.

Two themes emerged, namely, individual and socio-environmental, were associated with the eating behaviours of the female workers in this study. The individual factors correlated with food sensory attributes, healthy eating awareness, and lack of self-efficacy. The role of mothers, food-related social facilitation, and food environment were the significantly associated socio-environmental factors.

Individual factors

Individual factors may be categorised as (i) food sensory attributes, (ii) healthy eating awareness, and (iii) lack of self-efficacy.

Food sensory attributes

The interviews revealed that sensory features of foods namely the taste and appearance of food, were the most common factors affecting food choices.

“My first consideration in choosing food is taste. Price and appearance of food are secondary considerations. If it tastes bad, why should I eat?” (FGD 1-Young female worker 4)

The tastes of food, such as sweet, salty, and spicy, were frequently mentioned. Most participants preferred spicy foods. A pleasant taste had a powerful influence in the decision-making that is related to food consumption.

“I love bakso very much. Not only because the taste is good, but it is also cheap. Couple bakso and sambal, and it brings an intense flavour that is really delicious” (In-depth interview-Young female worker 2)

Healthy eating awareness

The female workers indicated that they were aware of the benefits and positive health results of healthy eating habits. The term ‘healthy eating’ was constantly associated with ‘vegetables’, ‘fruits’ and ‘family meals’. A majority of the young women discussed the benefits of healthy eating, and their statements included phrases/terms such as ‘strong’, ‘keeping body fit’ and ‘stay slim’.

“...eating healthily makes us stronger and reduces the chance of getting sick” (In-depth interview-Young female worker 5)

Some of these young women also suggested that healthy eating practices should be based on ‘4 sehat 5 sempurna’, which means ‘four basic five excellent’ in English. This is an Indonesian nutrition slogan that was promoted from 1955 to 1999. The campaign on this slogan promoted four food groups based on the essential nutrients they contained; these were staple foods, side dishes (plant- and animal-based protein source foods), vegetables and fruits as well as milk for enhancement. Therefore, the consumption of all the four food groups with milk as the fifth were considered to be the perfect diet.

“4 sehat 5 sempurna is truly the best definition of healthy eating, because you will get food full of nutrients” (FGD 2-Young female worker 5)

Lack of self-efficacy

A gap was observed between nutrition awareness and the difficulties experienced in putting this knowledge into daily practice. Despite their awareness about healthy eating habits, there appeared a lack of self-control when it came to choosing food for consumption. The taste of the food strongly determined their preferences and selections.

“I can’t resist eating spicy food. It feel tasteless if I don’t eat spicy foods” (FGD 2-Young female worker 6)

In a few cases, although the female workers became ill owing to a poor choice of food, it did not prevent them from changing their eating behaviour. The lack of self-control appeared to lead to poor food eating habits.

“I know that I have a gastric problem. My mother has always warned me before about it, but I just can’t resist the food” (In-depth interview-Young female worker 3)

Socio-environmental factors

Socio-environmental factors may be categorised as (i) role of mothers, (ii) food-related social facilitation, and (iii) food environment.

Role of mothers

The mothers were important in influencing the eating behaviour of young female workers. According to the workers, the influence of parents was more significant than that of their workmates.

“I feel that our parents determine our eating habits more than our friends do. They know much more about their children because they have been living with their children since the children were born” (In-depth interview-Young female worker 9)

Some mothers also confirmed that they were confident of their role and influence in their families, particularly when it came to planning the family meal, which was important. Mothers identified family meals as an important influence on young women when selecting foods.

“I feel that my role as a mother to provide food has shaped my daughter’s food behaviour and I am sure I am giving the best meal to my family as well” (In-depth interview-Mother 3)

Mothers influenced the eating behaviour of their children by teaching them about healthy food consumption. In particular, they tried to prohibit the female workers from eating spicy foods and encourage them to have breakfast before going to work.

“My mother does not allow me to go to work if I do not have my breakfast. She also does not want me to eat spicy food” (In-depth interview-Young female worker 2)

Food-related social facilitation

The participants claimed that besides their parents, their peers at the workplace had a significant influence on their eating habits. For example, eating with their peers tended to lead to increased food intake, and they mentioned feeling comfortable eating with peers.

“I like eating out with my workmates because it is much more fun compared to eating alone. We can eat and

talk about a lot of things” (In-depth interview-Young female worker 9)

In most events where food-related social facilitation was practised, there tended to be higher consumption of less healthy foods.

“I saw my friends eat spicy food and they wanted me to eat it as well. At first, I did not really like it, but they kept telling me to do so. Now I prefer to eat spicy foods” (FGD 2-Young female worker 1)

Food environment

A significant factor in influencing the food consumption behaviour of the participants was the availability of less healthy foods in the workplace and social settings where they lived. Increased access to money and the freedom they enjoyed influenced their food shopping behaviours.

“...today I will eat that sweet snacks on the first floor of our department store, and tomorrow probably I am going to eat the spicy snacks on the third floor...” (FGD 2-Young female worker 6)

A small number of the participants preferred to bring their lunch from home.

“I always bring my lunchbox from home. Because when it comes to break or lunch time, there are no food stalls nearby. So, I prefer to bring my own lunchbox here” (In-depth interview-Young female worker 6)

DISCUSSION

According to the socio-cognitive theory of Bandura (1989), personal and socio-environmental factors, such as social support, can directly and indirectly influence behaviour, including self-

efficacy, which is “an individual’s belief in their own ability to perform a particular behaviour and is considered a determinant of certain behaviours”. Specifically, “dietary self-efficacy refers to the extent of an individual’s ability to perform dietary behaviours and consider how people personally respond to barriers”. A lack of dietary self-efficacy would result in unhealthy eating behaviours. A study of young individuals showed that higher dietary self-efficacy correlated with higher intakes of fruits and vegetables (Bere & Klepp, 2004) and lower intakes of fatty foods (Frenn, Malin & Bansal, 2003).

The present study identified several issues pertaining to the eating behaviours of a sample of young female workers of low economic status in Malang City. The most pertinent finding that emerged from the FGDs and in-depth interviews was that while they may have been aware about healthy eating, they felt that they lacked self-efficacy to practise it owing to several challenges in their living and work environments. The majority of the female workers were unable to resist the temptations of eating unhealthy foods that were easily available and affordable.

The majority of the working participants stated that they considered the taste of food as a priority, rather than the nutrient content, when making food choices. The sensory properties of a food played a most important determinant in food choices in the absence of economic and availability constraints (IFIC, 2014). Affordability and accessibility of food items have been well documented as important drivers of food choice (Kourouniotis *et al.*, 2016). It has been postulated that the influence of taste on decision-making is more compatible with factors such as cost and convenience, but less compatible with factors like nutrition. A knowledge of nutrition is necessary but is not

sufficient for encouraging changes in food choice behaviours and hence may not be the primary motivation for food choice (Worsley, 2002). A systematic literature review by Vaitkeviciute, Ball & Harris (2014) suggested the term 'food literacy', to indicate not only the individual's understanding of basic information about food and nutrition, but also his/her ability to practise this knowledge in daily life.

This study found that peers, such as friends or workmates, strongly influenced the eating behaviour of the female workers primarily because of the significant amount of time they spent together. The participants claimed that their peers had a more significant influence on their eating behaviour than their parents. Several studies have shown that peers affect food intake through social facilitation. Social facilitation increased food intake when eating occurred in the presence of others, as compared to when they eat alone (Herman, 2014). The presence of others directly increased the amount of food that was consumed and indirectly extended the duration of the meal (Herman, Roth & Polivy, 2003). Herman (2017) also opined that individuals preferred to experience the joy of eating in the company of friends, even to the extent of indulging in calorie-rich foods. In this study, the young workers were more likely to eat out during non-working days and tended to indulge in eating snacks and spicy foods while in the company of their peers.

The results from the in-depth interviews with the mothers of participants highlighted the importance of the roles of the mothers at home which were the procurement and preparation of food. The mothers showed their food preferences and played an important role in making food choices for their families. The mothers said they

influenced their daughter's food choices, firstly, by determining the types of food available at home, and, secondly, by providing general information about food and health. The mothers typically chose to provide vegetables, tofu and *tempeh* (fermented soy bean) on a daily basis. They explained how they selected and purchased nutritious foods and this gave them confidence as mothers. Our findings support those of other researchers that mothers considered feeding responsibilities, such as providing family meals, as part of their identity as mothers (Chapman & Ogden, 2009). In addition, mothers in this study often warned their daughters that spicy foods were unhealthy. In general, our study did not find the mothers encouraging their daughters to make positive changes in their dietary behaviour. This may be related to their limited knowledge on the importance of food and health. Previous research has suggested that mothers with higher levels of health and nutrition knowledge provide healthier food to their daughters, compared to those who have lower levels of nutrition knowledge (Johnson *et al.*, 2011).

Previous studies have also shown that the physical environment has important effects on consumers making food choices (Sallis & Glanz, 2009; Contento, 2008). Based on observations and statements of the participants, the living and working neighborhoods of the working participants may be described as being "obesogenic food environments". An obesogenic environment refers to the influences of physical environments, opportunities and any conditions that may promote obesity in an individual or in populations (Lake & Townshend, 2006). The easy access to affordable foods available in various locations, including street vendors and mobile trucks, is an important influence of eating behaviour.

The ease of availability, reasonable prices and good taste were the reasons why the young women preferred to consume foods from street vendors.

Limitations of study

The sample size of this study was relatively small and the results are hence not generalizable. In addition, it did not include quantitative measurements of potentially important characteristics, such as body mass index and quantitative of food consumed.

CONCLUSION

Individual and environmental factors influenced the eating habits of young female workers from poor households in Malang City, East Java. These factors should be taken into consideration when designing nutrition intervention programmes to improve eating behaviour among the young women working outside the home. Nutrition education in the work area combined with changes to produce a healthier food environment maybe beneficial in changing their eating behaviour there.

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Authors' contributions

IYH, involved in the recruitment of participants, field work planning, data collection and writing of the first draft of the manuscript; IB, contributed to data interpretation; JF, contributed to data analysis. All authors participated in the conceptualisation and design of the study, critical revision of the draft and final version of the manuscript.

Conflict of interest

All authors declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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Eating behaviour of adolescent schoolgirls in Malang, East Java: a qualitative study

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ABSTRACT

Introduction: Poor eating behaviour is known to lead to nutritional deficiency among adolescents. At the same time, poor eating behaviour characterised by dietary excesses could lead to overweight and obesity. The present study aimed to explore the eating behaviour of adolescent schoolgirls in Malang, East Java Province, Indonesia, and to determine the factors that influenced their eating behaviour. **Methods:** This was a qualitative study, guided by the Social Cognitive Theory (SCT), which focused on individual and environmental influences to better understand health-related behaviours, such as eating behaviour. Triangulation was applied to the study subjects (adolescent girls, their mothers, and school staff). The methods used included individual in-depth interviews and focus group discussions. Qualitative data analyses were performed using Atlas.ti 7. **Results:** Most participants showed poor eating behaviour that was characterised by skipping breakfast, frequent consumption of fast foods and the consumption of local food with low nutrient content. Their eating behaviour was influenced by individual factors including personal preferences, the price of the food, and by environmental factors, such as the family, school and neighbourhood. **Conclusion:** Our findings showed that adolescent girls in Malang appeared to be aware of healthy eating but they showed unsatisfactory eating practices. Interventions are suggested to improve the poor eating behaviour of the adolescents toward avoiding malnutrition consequences.

Keywords: Eating behaviour, adolescent schoolgirls, Malang, Indonesia

INTRODUCTION

As adolescence is a critical stage of physical and psychological growth and development, healthy dietary behaviour during this period is important. A previous study has reported that adolescents are prone to poor eating, with a tendency to a high consumption

of energy-dense foods, sugar-sweetened beverages, and a low intake of fruits and vegetables (Rathi, Riddell & Worsley, 2017). Adolescents, particularly girls, are prone to nutritional deficiencies owing to poor intake of nutrients that are needed to support the growth spurt and the body's demand for iron during

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menstruation (Mesias *et al.*, 2013). On the other hand, dietary excesses during adolescence may lead to overweight and obesity (Sahoo *et al.*, 2015). Poor eating habits formed during adolescence may persist into adulthood (Craigie *et al.*, 2011). Therefore, establishing a healthy eating behavior during adolescence has both short- and long-term health benefits.

In Indonesia, a study found that low socioeconomic status (SES) is associated with iron deficiency among adolescent girls (Sumarlan, Windiastuti & Gunardi, 2018). In East Java, the prevalence of chronic energy deficiency in women of reproductive age (15–49 years) was higher than the national rate, while the prevalence of stunting among adolescents was comparable to the national rate (MOH Indonesia, 2013).

Several qualitative studies have reported that adolescent food choice behaviour was influenced by the SES (Maulida *et al.*, 2016), food preferences, familial factors (home food environment, parental style), food accessibility and availability (Fitzgerald *et al.*, 2010). However, there are currently few qualitative studies on the eating behaviour of Indonesian adolescents and its associated factors.

The aim of the study was to explore the eating behaviour of adolescent girls (aged 15–18 years) from low SES backgrounds in Malang, East Java Province, Indonesia and to identify the factors that drove their eating behaviour. The study used a qualitative research approach and was guided by the Social Cognitive Theory (SCT) (Bandura, 1998). The SCT is a widely used theory applied in interventions to promote healthy eating among adolescents (Fitzgerald *et al.*, 2010; Hall, Chai & Albrecht, 2016). This theory focuses on the interactions among individuals, and their social and physical environment to explain health-related behaviour such as eating practices.

MATERIALS AND METHODS

The primary subjects were adolescent schoolgirls while the secondary subjects were mothers and school staff as informants to validate the opinions of the girls. The study was conducted in three public high schools in Malang. Malang is the second largest city in the East Java Province. According to the National Socioeconomic Survey (Central Bureau of Statistic Indonesia, 2013), it has the highest proportion (16%) of adolescent girls aged 15–18 years within the total number of women aged 15–49 years.

The triangulation technique was used in validating the interpretation of the data collected from different sources. In this study, the triangulation sources used were different subjects (girls, mothers, and school staff), as well as different methods (individual interviews and focus group discussions [FDGs]). The FGD approach provides a relaxed atmosphere as the subjects are in the company of their peers (Daley, 2013). Therefore the FGDs were done at their schools at the beginning of the data collection stage to gain a preliminary understanding of the general situation of the eating behaviour of the adolescents and their lifestyles. Following this first stage of understanding, individual interviews of the girls and their mothers were done separately at home, in order to obtain more insightful responses. The interviews with the school staff were conducted at the schools.

The FGD and interview questions to the girls were similar because the two methods were used to different girls as a way to triangulate communal perception. However, we started the interview by asking about the daily routine and daily eating practices of the participants. The FGD started with a discussion of similar and/or different eating habits among the participants. Examples of the questions posed to the girls are stated in Table 1.

Table 1. Sample questions for adolescent girls

No.	Sample questions
1.	Tell me about your daily eating routine during weekdays and weekends?
2.	What kinds of food do you like to eat? Why do you like them?
3.	What does a healthy eating mean to you?
4.	Tell us about the places in your neighbourhood where you can get food.
5.	What do you think about the food available in your school?

Participants

Our study focused on adolescent girls aged 15-18 years, from low-income families who were enrolled in a public high school or public vocational school in Malang. The girls who were selected were mostly of low SES and attended public schools which charged school fees that were reasonably affordable to them. In addition, the SES level was determined based on demographic information gained during the screening process and their monthly household income range IDR 700,000–2,000,000 IDR (US\$47.51–135.75) which was categorized as C and D classes based on Nielsen's classification in 2010 (Table 2). The girls were excluded from selection if they had difficulty in communicating, mental illness and/or learning disability.

The mothers of the adolescent girls (aged 15-18 years) that fulfilled the inclusion criteria above were selected for triangulation. The school staff members who were selected were employed at one of the selected schools and were willing to participate on the day of data collection.

Purposive sampling was used to recruit mother and girl (daughter) pairs for the interviews. Participants were selected from two of the most highly populated sub-districts in Malang, namely Kedungkandang (43,666 households) and Sukun (45,666 households) (Central Bureau of Statistic Indonesia, 2013). The screening process involved visiting the homes of the girls and asking them and their mothers about the household income and expenditure.

Participants for the FGD were selected from the three public schools that were willing to participate in the study. At each school, the staff selected 10-20 female students who received school fee subsidy. The researcher then invited the selected students to complete a demographic information form to screen the parental income so as to ensure it met the requirements for low socioeconomic level. Out of the 45 adolescent girls from three schools, 25 were eligible. A total of 19 girls were included in the FGDs as the rest were

Table 2. The Nielsen's classification of the Indonesian socioeconomic segments[†]

Segment	Monthly household expenditure (Indonesian Rupiah / month) [‡]	Proportion (%)
A	≥ 3,000,000	13
B	2,000,000 – 3,000,000	27
C1	1,500,000 – 2,000,000	28
C2	1,000,000 – 1,500,000	21
D	700,000 – 1,000,000	8
E	≤ 700,000	3

[†]Nielsen (2010)

[‡]The expenses included daily food, electricity, water and monthly rent and excluded paid yearly rent, installment payment, furniture and irregular expenses.

absent or because the discussion times conflicted with their examinations.

Each FGD involved 6-7 students per school. The staff members at the schools were recruited for the FGD by convenience sampling. Two of the three staff who were selected had worked in the school for 15-20 years. One was a teacher and the others were student counsellors.

No specific criteria were applied when selecting the schools except that they had to be public schools located in the study area and were willing to participate in the study.

Procedure

The study was approved by the Ethical Committee of Atmajaya Catholic University (approval number: 771/III/LPPM-PM.10.05/08/2014). The estimated point of saturation was observed after interviewing nine adolescent girls, their mothers, and conducting three group discussions with 19 adolescent girls.

Data collection took place between September to October 2014. All the participants gave written consent prior to each FGD and interview. The researcher facilitated the FGDs and interviews with a note-taker, and the discussions were also audio-recorded with the consent of the participants. The questions in the FGD and in the interview guidelines were similar. The objective of the FGDs, which were conducted at the beginning of the data collection, was to become familiar with the daily activities and food practices of the girls. Topics such as the eating behaviour of the girls were addressed in-depth during the interviews. The FGD sessions lasted for about 40-50 min, while in-depth interviews lasted for about 50-70 min. Mothers and girls were interviewed separately, after which all the participants were interviewed together.

Data were analysed using the inductive thematic analysis approach, moving from specific to more general

conclusions. Recordings of the FGDs and interviews were transcribed verbatim and the field notes were documented. Each individual transcript was repeatedly reread and re-examined to ensure reliability. The key concepts were identified by coding the data and then by categorising the codes. Coding and categorising were carried out using qualitative data analysis software Atlas.ti version 7. When all the data were categorised, similar categories were grouped into themes.

RESULTS

The two themes that emerged in relation to the eating habits of the girls were the skipping of breakfast and the consumption of fast foods. The factors that influenced the eating habits of the girls are presented below according to individual and environmental influences. Examples of quotes are shown below to illustrate each theme.

Adolescent girls' eating behaviour

Theme 1: Breakfast skipping

During the weekdays, the majority of the adolescent girls from low socioeconomic background in Malang skipped breakfast.

"The food was not ready in the morning; anyway, I don't have time to eat food" (Girl-FGD 1)

"I'm not used to eating breakfast since I was a child; my stomach feels queasy if I have breakfast" (Girl-FGD 3)

"I must hurry to go to school, so I have no time for breakfast, but then I'll bring a lunch box" (Girl-FGD 2)

Although the mothers and school staff were aware of this behaviour, they did not mention during the FGD whether they encouraged the girls to have breakfast.

"She wasn't used to having breakfast, but usually she brings a lunch box to school" (Mother 2)

"Most of them don't have breakfast; when they get sick or have a headache, they come to us asking for medicine and when we ask whether they had breakfast most of them reply that they had not" (School staff 2)

Theme 2: Fast food and locally available food consumption

The majority of the girls in this study reported that they liked to consume fast foods and local foods, because of the taste and its availability in many places in the neighbourhood, such from street food vendors and in the school canteen.

"I like bakso (meatball soup; meatball consisting usually a small quantity of meat and a lot of flour, or without any meat completely made with flour); it's tasty, cheap and available everywhere" (Girl 4-Interview)

"I like cilok (fried-small bakso served with peanut spicy sauce), it's tasty" (Girl 2-Interview)

"I like eating burgers, it's tasty" (Girl 6-Interview)

"Where do you buy it?" (Interviewer)
"From the street vendors, it's cheaper than from the fast food restaurants" (Girl 6-Interview)

The school staff confirmed this behaviour.

"I have observed that high school girls love to eat something that tastes savory. If you observe them at the canteen, they like to eat bakso and noodles with a lot of spicy sauce" (School staff 2)

Factors influencing the eating behaviour of adolescent girls

The eating behaviour of girls' is influenced by individual and environmental factors.

Theme 1: Individual influences

(i) Knowledge and awareness

The girls discussed healthy eating and mentioned that it meant eating specific foods such as vegetables, fruits and foods containing nutrients. Healthy eating was also defined by the girls as consuming food that was prepared at home, as they believed that the cleanliness was superior and the ingredients were known. One girl in a FGD defined eating on time as part of healthy eating.

"I don't know exactly, but I think healthy eating is eating vegetables and fruit" (Girl 3-Interview)

"Consuming food containing carbohydrate, protein, vitamins" (Girl-FGD 2)

"Having meals on time and not skipping meals" (Girl-FGD 1)

"Eating home-made food is healthy because we know how it was cooked; we are also sure of the cleanliness of the processing of the food" (Girl-FGD 2)

The majority of girls reported that they were aware of the general benefits of healthy eating such as providing support for body growth and immunity.

"Healthy eating makes us strong and as a result it is not easy to get sick" (Girl-FGD 1)

"Healthy eating will support our body growth" (Girl 1-Interview)

Mothers perceived healthy eating as the consumption of food prepared at home

and which were healthy foods such as vegetables, tofu and tempeh.

(ii) Food preferences

The adolescent girls stated that the taste of food was the most important factor that influenced their decisions on the choice of foods. Overall, the girls were enthusiastic when talking about savory, sweet or spicy foods. On the other hand, vegetables were associated with unpleasant and negative taste experiences.

“Taste of the food is important. I like savory food because it’s tasty” (Girl-FGD 2)

“I like eating snacks because it tastes good” (Girl-FGD 3)

“Vegetables? I don’t eat it very much because it’s tasteless” (Girl 4-Interview)

“I don’t like cabbage because it’s bitter” (Girl 2-Interview)

Mothers and school staff also reported that taste preferences influenced the girls when making food choices. Mothers understood that healthy foods such as vegetables were good for their children and which were often available at home. But they often compromised with their children and did not put pressure on them to eat vegetables.

“It’s hard to tell my daughter to eat vegetables. She said vegetables are not tasty” (Mother 6)

“If I force her to eat vegetables, she won’t eat the food at all. So, I let her eat what she wants” (Mother 1)

“Mostly the students only consider the taste of the food without considering whether it is healthy or not” (School staff 1)

(iii) Price of the food

Most of the girls indicated that they often preferred foods that were cheaper and easy to buy even though they are not healthy.

“Unhealthy food, like bakso, is cheap, and the bakso seller is easy to find near the house” (Girl 4-Interview)

“I don’t have enough pocket money, so most of the time I only buy snacks at school” (Girl 6-Interview)

“The food sold by street vendors or school canteen is cheaper than that sold in the mall. This is because the facilities to make the food are not good and the ingredients are cheaper” (Girl-FGD 2)

School staff believed that the girls preferred tasty and cheap foods over healthy food.

“They will consider taste and price for food choice. The canteen in this school sells cheap meals like bakso. They’re likely to buy this kind of food instead of healthy food” (School staff 2)

Theme 2: Environmental influences

(i) School and neighbourhood

The availability and accessibility of fast foods and local foods in the school canteen and the neighbourhood, such as from street vendors or casual shops, was the most frequent reason expressed by the adolescent girls for deciding on their food choices.

“I often buy savory snacks and cold sweet drinks at the school canteen” (Girl 2-Interview)

“I like eating bakso but sometimes I didn’t eat bakso in a week, if the bakso seller in the canteen was away” (Girl 7-Interview)

"We want to eat fruits, but there's no fruit seller in the school canteen, not even a fresh juice seller" (Girl-FGD 1)

"I like eating burgers" (Girl 4-Interview). *"Where do you buy it?"* (Interviewer) *"From the street vendors near my home"* (Girl 4-Interview)

"She used to like vegetables, but now she doesn't. Maybe it is because she now often buys varieties of food that are sold by the street vendors" (Mother 9)

Some girls commented on the school rules about food restrictions in the canteen, which prohibit spicy foods and certain local fast foods. A school staff member confirmed that there were some rules about foods at school but that they were limited to spicy foods and foods with unpermitted colorants.

(ii) Family

All the girls reported that mothers often warned them not to eat unhealthy foods. Unfortunately, the rules were often prohibited only spicy foods.

"Mom told me not to eat spicy foods, but I still eat it at school. Sometimes I followed her rule, but sometimes I disobeyed it" (Girl 5-Interview)

"Mom told me not to eat too much spicy food and instant noodles" (Girl-FGD 3)

"Sometimes I eat spicy foods at school or when my mom is working" (Girl 4-Interview)

"I prohibit her eating food with chilli sauce; I told her that it's not good for her health" (Mother 8)

The mothers were aware that the girls often bought fast foods or poor-nutrient foods from the school canteen or street vendors, but there were none of them

said anything to discourage the girls from doing so. Instead, mothers tended to accept the food choices of their daughters.

"She used to like vegetables, but now she doesn't. Maybe because now she often buys varieties of food that are sold by the street vendors" (Mother 9)

"I don't think they are eating healthy food at school. They mostly eat bakso, I guess. But, at home, they eat food that is healthy because I prepare vegetables, fish, tofu and tempeh" (Mother 5)

DISCUSSION

The findings of this study appear to be aligned with some of the influences on healthy eating that are described in the SCT (Bandura, 1998). Using the SCT as a guide, the influences on the eating habits of adolescent girls were considered as (i) individual factors (such as knowledge and awareness, food preferences and food price) and (ii) environmental factors (family, school and neighbourhood).

Our study found that most adolescent girls had some knowledge about healthy eating and were aware of its benefits. However, their eating behavior did not reflect their awareness. They often skipped breakfast and showed a personal preference for unhealthy food, such as fast foods and local, nutrient-poor foods. It would appear that knowledge of healthy eating and its benefits are not related to healthier eating practices (Rathi, Riddell & Worsley, 2017).

The girls frequently reported that the taste of the food was an important factor affecting their choice of food. This may, in part, explain the fact that they give priority to short-term considerations of eating behaviour, such as pleasure, rather than long-term outcomes, such as prevention of disease. Other studies have shown that factors such as taste, texture and the appearance of food

were more important than knowledge of healthy eating among adolescents (Fitzgerald *et al.*, 2010).

The main reason given by the girls for their preference for fast foods and local foods is that they were affordable and readily accessible. The girls mentioned several times that unhealthy foods, i.e. fast foods, nutrient-poor foods, and foods sold by street vendors, were cheaper than healthy foods. The girls in the present study came from low SES households and had limited pocket money for purchasing food. Therefore, cost was a determinant in choosing food. This is in line with other studies on students from low income families who chose foods based on convenience and affordability (Maulida *et al.*, 2016). A study among Chinese adolescents similarly reported that unhealthy foods were cheaper and popular among them (Chan *et al.*, 2016).

The SCT describes the importance of socio-environmental factors in influencing eating behaviours (Bandura, 1998). The lack of school rules and ease of availability of food were revealed as key factors that influenced the eating behaviours of the girls in this study. Mothers of the girls and school staff members expressed concerns about their easy access to fast foods and local nutrient-poor foods in the school canteens. Some schools had no rules to restrict unhealthy foods. The school staff members confirmed that the school rules were guided by food hygiene and safety rather than nutritional quality. Other qualitative studies have also reported that the availability of food at schools was a factor that influenced the food consumption habits of adolescents (Naidoo *et al.*, 2017; Verstraeten *et al.*, 2014). As school meals can contribute 30-40% of daily calorie intake of students (Osowski *et al.*, 2015; Nathan *et al.*, 2016), it is imperative for schools to promote healthy food consumption (Bevans *et al.*, 2012).

Parents, especially mothers, play an

important role in influencing the food behaviour consumption of their children (Pearson, Ball & Crawford, 2012). The mothers in this study recognised that their daughters practised unhealthy eating habits. However, both girls and their mothers did not mention any strict rules regarding eating practices, beyond warnings not to consume spicy foods. The mothers believed that it was difficult to expect their children to eat healthily if they (the parents) did not do so themselves.

Based on the SCT, socio-environmental factors, such as parental and societal support, can influence the food intake behavior seen among adolescents (Salvy *et al.*, 2011; Story, Neumark-Sztainer & French, 2002). Parental knowledge has been associated with healthy eating habits in children (Grosso *et al.*, 2012; Ansem *et al.*, 2014). Nevertheless, the role of mothers may be limited only to the provision of healthy food at home. Mothers in this study stated that the healthy food they usually prepared were simple dishes such as fish, vegetable, tofu and tempeh.

This study only examined adolescent girls from Malang and thus our findings may not apply to all adolescent girls in Java Province, much less throughout Indonesia.

CONCLUSION

A sample of adolescent girls from low SES in Malang, Indonesia showed some knowledge about healthy eating but did not show healthy eating practices, in skipping breakfast and consuming fast food and nutrient-poor foods. The factors influencing the adolescent girls' eating behaviours were driven by individual preferences as well as by the environmental factors. Future interventions should not only target adolescents, but also schools, the community and their family members as well. School breakfast and healthy school canteen programmes, nutrition

education for parents, price subsidy (to decrease the cost of healthier items) should be considered for future research.

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Authors' contributions

MS, undertook data collection and wrote the manuscript; IB, provided expertise on data interpretation and writing input; JF, provided expertise on the study design and data analysis. All authors approved the final draft of the manuscript.

Conflict of interest

The authors declare that there are no conflicts of interest.

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Perceptions of the causes of obesity among normal weight, overweight and obese Indonesian women: a mixed methods approach

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ABSTRACT

Introduction: Overweight and obesity (OW/OB) among adults is a public health concern in Indonesia. While OW/OB is generally attributed to consumption in excess of expended energy, understanding the perceptions of the causes of obesity among OW/OB individuals may provide insights for developing appropriate obesity-reduction interventions. **Methods:** This study used a mixed methods approach, comprising a quantitative online survey and in-depth interviews. The online “International Families and Food Survey” was conducted in 2014 by Global Market Insite (GMI) to elicit response of Indonesian women to 12 likely causes of obesity, based on a 5-point rating ranging from ‘definitely disagree’ to ‘definitely agree’. A total of 377 respondents aged 18-49 years from Jakarta participated, comprising 221 normal weight (NW) and 156 OW/OB based on World Health Organization (WHO) cut-offs. Additional 16 informants who fulfilled the inclusion criteria were recruited for in-depth interviews to gather further insights on causes of obesity. Logistic regression was conducted to assess the likelihood of socioeconomic factors in predicting “agreement on the likely causes of obesity”. **Results:** The online survey showed that the NW and OW/OB respondents provided quite similar rating response to each of the likely causes of obesity. Unmarried and middle socioeconomic status (SES) respondents were significantly more likely to agree on the perceived causes of obesity, compared to married and high SES. In-depth interviews revealed OW/OB informants attributed obesity to environmental factors, compared to individual factors attributed by NW informants. **Conclusion:** Use of mixed methods approach provided insights for the development of obesity-reduction interventions among Indonesian adult women.

Keywords: Indonesia, obesity, overweight, women, perception on obesity causes

INTRODUCTION

The prevalence of overweight and obesity (OW/OB) has escalated worldwide. In 2014, more than 1.9 billion adults, aged

18 years and older, were overweight with higher prevalence in women (15.0% women versus 11.0% men) (WHO, 2015). Of these, over 600 million were obese.

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The worldwide prevalence of obesity more than doubled between 1980 and 2014 (WHO, 2015).

Asian countries have also experienced increases in OW/OB prevalence. The increase in prevalence in China over the last 20 years was 400% (Asia Pacific Cohort Studies Collaboration, 2007). Malaysia experienced a three-fold increase in obesity prevalence among adults, from 4.4% in 1996 to 14.0% in 2006 (Khor, 2012). Likewise, OW/OB prevalence among adults in Vietnam more than doubled from 1992 to 2002 (2.0% to 5.7%) (Tuan, Tuong & Popkin, 2008). In Indonesia, OW/OB among adults have become a serious public health problem (Kemenkes RI, 2007; Kemenkes RI, 2010; Kemenkes RI, 2013). The National Basic Health Survey reported that approximately 13.5% of adults (ages ≥ 18 years) were overweight and 15.4% were obese, with the prevalence being higher among women in urban areas, and in individuals with higher education (Kemenkes RI, 2013). This situation is likely to worsen considerably unless preventive measures are taken.

Being OW/OB is the consequence of consumption of energy in excess of expenditure (Kazaks & Stern, 2013). This imbalance between food consumption and physical activity is influenced by an individual's health behaviour and environmental factors (Kazaks & Stern, 2013). An individual's health behaviour is, in turn, affected by psychological and physical capabilities that include having the necessary knowledge and skills (Michie, van Stralen & West, 2011). People's thoughts (or cognitions) have a direct influence on behaviour (Kazaks & Stern, 2013). As part of individual's cognition, perception plays an important role. Perception is a "process by which individuals organise and interpret their sensory impressions in order to give meaning to their environment" (Robbins & Judge, 2013). According to Passer & Smith (2009), "how people perceive a situation determines a different

reaction and each reaction creates a different outcome". Understanding the perceptions of OW/OB people themselves about the factors leading to obesity may increase our understanding on how they may respond to weight-reduction interventions.

The rapid increase in the prevalence of OW/OB among adults has led to the development of large-scale prevention strategies (Aronne *et al.*, 2009). However, for population-level prevention strategies to be effective, they need to be accepted and supported by the general population, which, in turn, requires an understanding of the perceptions, beliefs and attitudes held within the affected community (Lombard, Deeks & Teede, 2009).

Several studies have investigated people's perceptions of the causes of OW/OB (Dryer & Ware, 2014; Jiménez-Cruz *et al.*, 2012; McFerran & Mukhopadhyay, 2013). Some have reported that people's perceptions about obesity are associated with their own body mass index (BMI), and OW/OB individuals tend to be more aware of the likely causes of obesity (Oksel, Gündüzoğlu & Topçu, 2015; Wang & Coups, 2010). However, psychological factors, such as the perceived control of body weight (Jiménez-Cruz *et al.*, 2012) and personal and social influences, have been less extensively studied. Few studies have compared the perceptions about the cause of obesity between OW/OB and normal weight (NW) subjects (Dryer & Ware, 2014; Oksel *et al.*, 2015; Wang & Coups, 2010). Such comparisons are useful for designing appropriate obesity-reduction intervention programmes that provide a comprehensive understanding of an individual's views regarding obesity (Nissen & Holm, 2015).

The present study comprised two objectives, namely (1) to analyse data obtained from the International Food and Families (IFF) online survey conducted in 2014 by Global Market Insite (GMI) on the perceptions of the causes of obesity

among Indonesian women with NW and OW/OB; and (2) to interview in-depth, eligible women in order to obtain further insights on women's perceptions of the causes of obesity.

MATERIALS AND METHODS

This study employed a mixed methods study design, in which the quantitative on-line survey preceded the qualitative study.

On-line survey

Study design and respondents

The data from the IFF online survey conducted in 2014 by GMI was used in this study. The GMI is an online market research company that carried out the IFF survey in Australia, China, Singapore, Vietnam and Indonesia for Deakin University, Australia. A large number of questions were posed in The Families and Food Survey (FFS) (Worsley *et al.*, 2017). The FFS database provided a convenient sample of volunteers who fulfilled the inclusion criteria of being adults aged 18–64 years who were the main household food providers. The latter was ascertained via a screening question “Who does the food shopping in your household?”. Respondents who did not self-identify as food providers were excluded from the survey. Potential respondents were sent an email inviting them to participate (Worsley & Ridley, 2014a; Worsley & Ridley, 2014b). The FFS data was used with permission of the principal investigator of the online survey (Professor Tony Worsley).

This report focused on the findings of the perceptions of the Indonesian respondents on the causes of obesity. The online survey included 377 Indonesian women from Jakarta and West Java, aged 18–49 years. Out of the total, 221 women had NW while 156 women were classified as OW/OB based on BMI derived from self-reported height and weight. The BMI categories were based on the Asia Pacific Classification System

(NW: 18.5–22.9 kg/m²; OW/OB: ≥23.0 kg/m²) (WHO Expert Consultation, 2004). All respondents had access to the Internet and were predominantly university graduates.

The respondents were asked to provide information on demographic characteristics, including age, education, marital status and household income, as well as their current body weight and height. The respondents were also requested to provide their ratings on a list of 12 likely causes of obesity. They were asked to rate their perceptions as to whether they agreed or disagreed with each of the items on a 5-point scale, ranging from 1 = Definitely not a cause of obesity; 2 = Not a cause of obesity; 3 = Not sure/neutral; 4 = A cause of obesity; 5 = Definitely a cause of obesity.

Data analysis

SPSS for windows version 20 was used to analyse the response from the online participants. The 5-point scale reliability was determined by using Cronbach's alpha to measure the internal consistency, that is, how closely related the items were as a group. The Cronbach's alpha for the likely causes of obesity was acceptable at 0.721. The logistic regression was conducted to assess the likelihood of the socioeconomic factors of the respondents in predicting the outcome of obtaining ratings of “1-3” and “4-5”, namely “disagree” and “agree” with the likely causes of obesity provided.

In-depth interviews

Informants and conduct of interviews

The informants were recruited from among women aged 18–49 years who were studying or working in Universitas Indonesia and living in Jakarta or its surrounding areas. Jakarta was chosen out of convenience as the study site for the face-to-face interviews. The first informant was knowingly selected while the rest were recruited using the snowball sampling technique. A total

of eight OW/OB and eight NW subjects were recruited. The interviews were held in a place with minimum noise. The interviews were audio-recorded with the permission of the informants. Each interview lasted approximately 60 mins. Two informants with some incomplete information were contacted via short message service and phone calls for additional interviews for clarification of their responses.

The in-depth interviews were focused on exploring the women's perceptions of the causes of obesity. The questions covered included concerns about their body weight and the steps they took to control their weight. Each interview commenced with the introduction of the researcher to the participants followed by an explanation about the study aims and activities. All the participants gave their consent to be included in the interview. Pictures related to the causes of obesity were used as interview tools.

Data analysis

A thematic data analysis of the interview data was performed according to Ulin & Robinson (2005). A preliminary analysis was conducted in the field during data collection for each interview. All the recorded in-depth interviews were transcribed verbatim. Repeated readings of the transcripts and listening to audio recordings by the researcher achieved data familiarisation. Development of codes and arrangement of the initial codes into a provisional set of themes was performed, followed by discussions with the research team to check for potential themes within the data against coded extracts and the complete dataset. The themes were refined to ensure that they accurately discriminated each other and conveyed the key messages from the interviews. Finally, the themes that emerged between the NW and OW/OB groups were compared. All processes were documented on Microsoft Word and Microsoft Excel.

Ethical considerations

This study was conducted according to the guidelines laid down in the Declaration of Helsinki. All procedures involving human subjects were approved by the Deakin University HEAG-H (Online Survey) and Ethical Committee of the Faculty of Medicine Universitas Indonesia (Qualitative study - Number 1069/UN2.F1/ETIK/2015). Written informed consent was obtained from all subjects.

RESULTS

Characteristics of respondents and informants

The sociodemographic characteristics of the online respondents ($N=377$) and in-depth interview informants ($n=16$) are shown in Table 1. There were 156 NW/OB and 221 NW respondents with no significant differences in their sociodemographic characteristics. Almost all the respondents (92.8%) had university level education (bachelor degree or higher), while more than half of them were married and ranged in age from 30-49 years.

The in-depth interview informants comprised 16 Indonesian women, of whom eight were NW and eight OW/OB. These informants were recruited because they had similar socioeconomic characteristics as the online respondents who were aged 19-49 years and mostly had university level education.

Online survey analysis

Respondents' ratings of the likely causes of obesity

The ratings of the respondents for the 12 likely causes of obesity are shown in Table 2. Based on the 5-point scale, a high proportion (exceeding 80.0%) of the respondents, regardless of their BMI status, rated either a 4 or 5, thereby perceived to "agree" or "definitely agree", with each of the following likely causes of obesity: eating oversized servings of foods; lack of physical activity

opportunities; people did not exercise enough; over-consumption of sugar sweetened drinks; regular consumption of fast foods; people were not aware of the dangers of obesity.

In contrast, ratings of either 1 or 2, indicating agreement with “definitely not a cause or not a cause of obesity” were accorded by at least 30.0% of the respondents, regardless of their BMI to: lack of safe cycling and walking paths. There was a sizable percentage (about 25.0-35.0%) of both NW and OW/OB respondents who expressed “not sure” (rating=3) for these likely causes of obesity: modern technology; lack of safe cycling and walking paths; promotion

of unhealthy foods and low prices of unhealthy foods.

Logistic regression analysis

The logistic regression analysis showed that among the socioeconomic factors included in the study, two were significant with ratings of “4-5”, that is “agree” with the likely causes of obesity provided (Table 3). First, being unmarried was 1.77 times significantly more likely (95% CI: 1.10-2.83; $p=0.018$) than being married for rating agreement with the causes of obesity. Also, respondents from the middle socioeconomic status (SES) were 1.84 times more likely

Table 1. Socioeconomic characteristics of the online survey respondents ($N=377$) and in-depth interview informants ($n=16$), who were classified according to body mass index (BMI)[†]

Characteristics	Online respondents			p^{\ddagger}	In-depth interview informants	
	Total ($n = 377$)	Normal weight ($n = 221$)	Overweight/ Obese ($n = 221$)		Normal weight ($n = 8$)	Overweight/ Obese ($n = 8$)
		%			n	
Age				0.451		
19–29 years	41.4	43.0	39.1		4	4
30–49 years	58.6	57.0	60.9		4	4
Education level				0.252		
school	7.2	5.9	9.0			
university	92.8	94.1	91.0		8	8
Marital status				0.428		
not married	40.8	42.5	38.5		4	4
married	59.2	57.5	61.5		4	4
Socioeconomic status (SES) [§]				0.095		
low	34.5	33.5	35.9			
middle	34.0	30.8	38.5			
high	31.6	35.7	25.6			
Working status						
not working					6	1
working					2	7

[†]Body mass index (BMI) categorised as normal weight (NW: 18.5–22.9 kg/m²); overweight and obese (OW/OB: ≥ 23.0 kg/m²) based on WHO Expert Consultation (2004)

[‡]Chi-square test; significance $p < 0.05$

[§]SES was defined based on tertiles of wealth index score (household ownership of assets) (MOH Indonesia, 2013)

Table 2. Ratings (%) of the likely causes of obesity among the online survey respondents (N=377) according to BMI status[†]

Likely causes of obesity [‡]	Normal weight (n = 221)					Overweight/Obese (n = 156)				
	5-point scales [§]					5-point scales [§]				
	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)
1. Modern technology	11.3	11.3	35.3	30.3	11.8	6.8	6.8	26.2	41.2	19.0
2. Lack of safe cycling and walking paths	13.1	17.2	33.5	31.2	5.0	16.0	15.4	34.0	26.9	7.7
3. Promotion of unhealthy foods	6.8	6.8	26.2	41.2	19.0	7.1	11.5	25.6	38.5	17.3
4. Low prices of unhealthy food	5.4	10.0	26.7	38.8	19.9	6.4	7.7	23.1	37.8	25.0
5. Eating over-sized servings of foods	6.5	4.1	6.3	30.8	58.4	0.6	1.3	4.5	33.3	60.3
6. Lack of physical activity opportunities	1.4	2.7	11.8	48.9	35.3	0.6	5.8	9.6	47.4	36.5
7. People do not exercise enough	2.3	3.2	4.1	47.1	43.4	0.6	2.6	7.1	40.4	49.4
8. Over-consumption of sugar sweetened drinks	0.9	5.4	2.3	38.0	53.4	1.3	3.8	4.5	35.9	45.5
9. Regular consumption of fast foods	1.8	2.7	8.6	34.8	52.0	2.6	4.5	10.3	34.0	48.7
10. People are not aware of the dangers of obesity	0.5	3.2	10.9	46.6	38.9	1.3	4.5	12.8	44.9	36.5
11. Lack of will power	5.0	5.4	29.0	42.5	18.1	4.5	6.4	23.7	37.8	27.6
12. Lack of availability of healthier foods	7.7	12.2	25.3	35.3	19.5	9.0	12.2	23.1	35.9	19.9

[†]Body mass index (BMI) categorised as normal weight (NW: 18.5–22.9 kg/m²); overweight and obese (OW/OB: ≥ 23.0 kg/m²) based on WHO Expert Consultation (2004)

[‡]Likely causes of obesity provided in the online survey

[§]5-point rating scale consists of: 1 = Definitely not a cause of obesity, 2 = Not a cause of obesity, 3 = Not sure/neutral, 4 = A cause of obesity, 5 = Definitely a cause of obesity; reliability analysis of the 5-point rating scale: Cronbach alpha: 0.721; variance: 34.77%

(95% CI: 1.10-3.07; $p=0.019$) of rating agreement with the causes of obesity, than the high SES counterparts. The logistic regression analysis revealed that, compared to the NW, the OW/OB women showed no significant difference in rating agreement with the causes of obesity.

Individual vs environmental causes of obesity

Out of the 12 likely causes of obesity provided to the online respondents, seven were arbitrarily classified as “individual factors”, indicating that these are actions or conditions that empower an individual to act in combating obesity. The remaining five causes of obesity were classified as “environmental factors” indicating they were beyond

an individual’s control, being more influenced or driven by industry, the government or other external parties.

Figure 1a and Figure 1b portray the perception response of the NW and OW/OB respondents towards the individual and environmental factors, respectively, as the likely causes of obesity. Overall, the NW and OW/OB respondents showed similar responses towards each of the individual and environmental factors as likely causes of obesity. The individual factor “over-consumption of sugar sweetened drinks” was ranked by most of the NW (91.4%) and OW/OB (90.4%) respondents as the most likely cause of obesity. Consuming “oversized servings of foods” was also highly perceived as an individual level factor of obesity (89.1% NW and 93.6% OW/

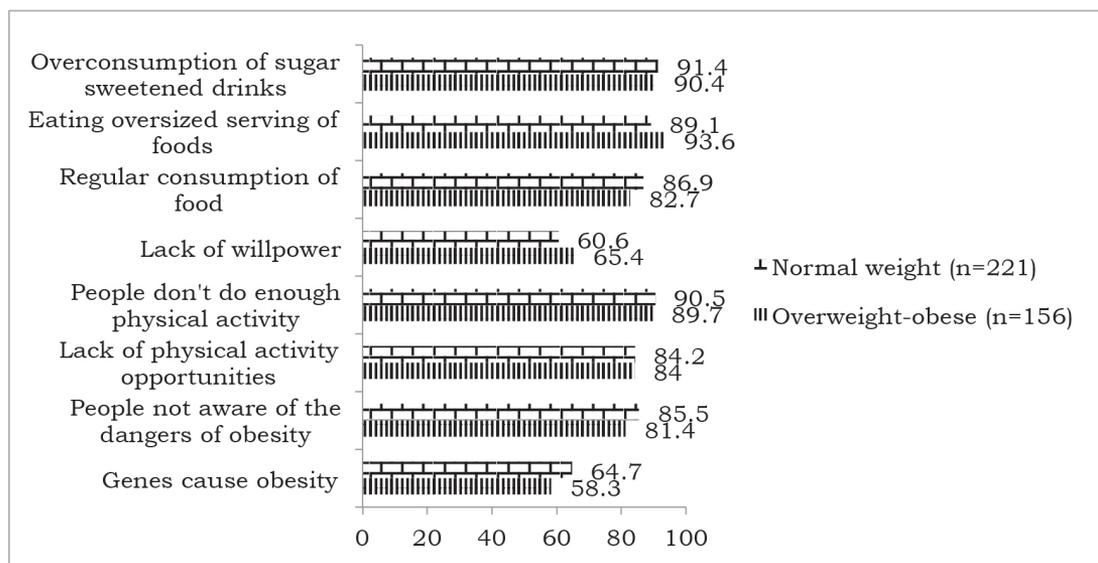
Table 3. Logistic regression analysis showing the likelihood (odds ratio) of socioeconomic factors in predicting “agreement with the likely causes of obesity” among the online respondents ($N=377$)

Socioeconomic factors	Agreement with the likely causes of obesity [†]		
	Odds ratio	95% CI	<i>p</i>
Body mass index			
Overweight/obese	0.91	0.59–1.39	0.682
Normal weight (Reference)			
Age			
19–29 years	0.91	0.57–1.45	0.701
30–49 years (Reference)			
Education			
School	0.679	0.29–1.56	0.363
University (Reference)			
Marital status			
Not Married	1.77	1.10–2.83	0.018*
Married (Reference)			
Socioeconomic status (SES) [‡]			
Low	1.05	0.61–1.82	0.844
Middle	1.84	1.10–3.07	0.019*
High (Reference)			

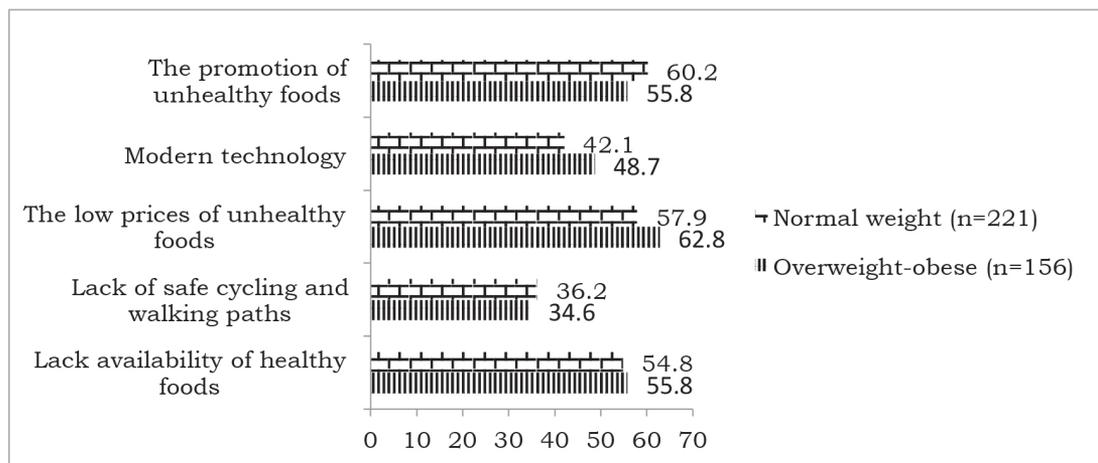
[†]Based on the respondents’ ratings, whereby ratings were recoded as “disagree” (1-3) and “agree” (4-5) with the 12 likely causes of obesity based on the 5-point rating scale: 1 = Definitely not a cause of obesity, 2 = Not a cause of obesity, 3 = Not sure/neutral, 4 = A cause of obesity, 5 = Definitely a cause of obesity

[‡]SES was defined based on tertiles of wealth index score (household ownership of assets) (MOH Indonesia, 2013)

* $p<0.05$



(a)



(b)

Figure 1. (a) Distribution (%) of response to individual factors and (b) environmental factors as likely causes of obesity, among the online respondents (n=377) according to NW vs OW/OB status

OB). Physical inactivity and the lack of opportunities for the conduct of physical activity were also perceived by NW and OW/OB as important individual factors leading to obesity.

In general, lower percentages of the NW and OW/OB respondents attributed obesity to environmental factors. Among

the environmental factors, “promotion of unhealthy foods” ranked high as a cause of obesity (60.2% NW and 55.6% OW/OB), while “low prices of unhealthy food” was also perceived as an important environmental factor leading to obesity (57.9% NW and 62.8% OW/OB).

Table 4. Individual and environmental factors perceived as causes of obesity by informants of in-depth interviews

	<i>Individual Factors</i>	<i>Environmental Factors</i>
Normal Weight Group	<ul style="list-style-type: none"> • Over-consumption of fatty food, salty food, high calorie food, fast food, soda, junk food, sweet beverages, sugar, sweet food • Over-consumption of calories • Over-consumption of meat, less vitamins and fibre • Skipping breakfast • Regular snacking habit • Extreme dieting • Lack of physical activity • Too much sitting • Stress • Lack of willpower • Genetic factors 	<ul style="list-style-type: none"> • Lack of availability of healthy food • Frequent hanging out with friends
Overweight/ Obese Group	<ul style="list-style-type: none"> • Over-consumption of food • Consumption of sweet food, sugar, junk food, sweet beverages • Regular snacking habit • Unhealthy eating patterns such as eating late after 10 pm • Lack of physical activity • Stress • Lack of willpower • Too much sleeping • Metabolic factors • Genetic factors 	<ul style="list-style-type: none"> • Lack of availability of healthy foods • Frequent meetings with clients at cafés • Frequent hanging out with friends • Lack of support from friends • Use of modern technology

Analysis of in-depth interviews

Perceived causes of obesity

The factors identified by the informants as the probable causes of obesity were classified as individual level and environmental causes of obesity. NW informants identified more individual factors whilst OW/OB informants tended to attribute obesity to environmental factors (Table 4). NW informants said that consuming more sugary and fatty foods, over-consumption of food and eating larger portions of food were causes of obesity of individuals.

“The composition of food is not really good. For example, the fat is too much because there is too much meat or there are less vitamins and fibre. Also, there are less vegetables and

fruits” (NW, 25 years old, married, working)

“The types of food consist more of fat, especially fast food which is high calorie and high fat, which certainly will cause obesity” (NW, 29 years old, unmarried, working)

Metabolic factors and stress were also stated as the causes of obesity.

“The metabolism in each person is different, for example although my physical activity is less, my food consumption is also less, but if I eat certain foods like chocolate or milk, tomorrow my body weight will increase” (NW, 26 years old, unmarried, working)

“Stress could also, lead to obesity; sometimes if we feel stressed we eat too much and it can make us obese” (OW/OB, 31 years old, unmarried, working)

NW women stated that extreme dieting and snacking habits might cause obesity.

“Going on extreme diets by drastically reducing the portion of food consumed triggers severe hunger pangs, which causes one to consume more food than previously, leading to an increase in body weight” (NW; 28 years old, married, unemployed)

“Always snacking. Like snacking while watching TV, if we run out a snack we then take another snack” (NW, 24 years old, unmarried, working)

Skipping breakfast and a lack of physical activity may cause obesity.

“Breakfast could cause obesity if too much is eaten. Sometimes, I avoid breakfast and I only drink milk” (NW, 25 years old, married, working)

“Eating patterns and a lack of physical activity also can lead to obesity; it happens if we are too lazy to move but we eat too much” (NW, 37 years old, unmarried, working)

“What we eat and what we do physically is not balanced. We eat too much food, but we do not do enough physical activity” (OW/OB, 29 years old, unmarried, unemployed)

When shown a set of pictures of street filled with fast food restaurants, predominantly individual factors were considered to be important by NW women.

“If an individual wants to be on a diet, they can and not be influenced by their environment” (NW, 22 years old, unmarried, unemployed)

“If we sit too much for too long. Such as if we sit in front of computer. I do not think this is good as we can become fatter” (NW, 31 years old, married, working)

Compared with NW women, their OW/OB counterparts identified more environmental factors as causes of obesity. Some of these were not mentioned by the NW women, such as frequent meeting with clients at cafés, no support from friends and modern technology.

“One of my friends said because she often had meetings at hotel, the variation of food is less. It is difficult to find healthy food, and it can influence our body weight later” (OW/OB, 27 years old, married, working)

One overweight woman stated that the increasing prevalence of obesity was the result of modern technology.

“One impact of current technology is that we are not required to move physically. As a result, people become fatter because they are becoming lazier to move” (OW/OB, 21 years old, unmarried, working)

Several overweight women also remarked that their friends did not support them and that their working environment contributed to their obesity.

“For instance, she has a friend named XX, and they always hang out and eat together. Suddenly, she wants to be on a diet, but XX says you do it by yourself. Even then, XX still always asks her to hang out together and have

lunch or dinner together, although XX knows that she is on a diet. This kind of friend has a great influence and does not offer support. This makes it difficult to diet” (OB/OB, 25 years old, unmarried, working)

“We cannot avoid meetings. Nowadays, meetings always take place at coffee shops, and they take a long time. We often drink something sweet and we stay out longer” (OW/OB, 27 years old, married, working)

One item that was not included in the options for causes of obesity in the online survey, was provided by married NW women and an overweight woman. This was the influence of children in the selection of foods. It was mentioned in the in-depth interviews of the older, married NW and the overweight women. A married, obese woman commented:

“For example, when my children want to eat at a fast food restaurant, and I am compelled to follow my children’s wishes, even though I know that this food causes me to gain body weight” (OW/OB, 34 years old, married, unemployed)

The results of the interview from both the groups revealed that most sources of obesity information came from the Internet. Experiences of friends and information from personal trainers were also mentioned as other sources of information about obesity.

“...from my personal trainer. At that time, there was a nutritionist from the fitness centre where I took the programme. He told me everything: which foods to avoid or eat in limited amount, the portions that needed to be decreased, and the alternatives” (OW/OB, 28 years old, unmarried, working)

“If we are asked to hang out, by boyfriend or friend, we cannot refuse. Of course if we go out, it is impossible not to eat outside” (NW, 30 years old, married, working)

DISCUSSION

The online response regarding the likely causes of obesity showed close similarities between NW and OW/OB respondents. Both groups recorded high ratings of agreement for several likely causes of obesity. In contrast, findings from the in-depth interviews showed qualitative differences, in that NW informants identified more individual factors as causes of obesity, compared to OW/OB informants, who tended to attribute obesity to environmental factors.

Obese people tended to believe that societal responsibility, such as high cost of food, had contributed to the increased prevalence of obesity (Brady, 2016; Dryer & Ware, 2014; Okonkwo & While, 2010). This study also indicates that the perceived causes of obesity described by the informants were more complex than simply a ‘dietary’ versus ‘exercise’ theory. The lack of willpower and of support from friends, frequent meeting with clients at café, hanging out with friends and modern technology were also perceived as causes of obesity. Several other factors are also known to contribute to a person’s weight, including family history and genetics, the metabolism of the individual, as well as behaviour and habits (Kazaks & Stern, 2013; Dryer & Ware, 2014).

The in-depth interviews raised the influence of children in the selection of food among older and married NW and OW/OB informants. This is consistent with the finding among Australian parents (Venn *et al.*, 2007). While the informants were aware that the consumption of fast foods was a cause of obesity, they could not resist the pressures resulting from the dietary

preferences of their children (Michie *et al.*, 2011).

Several factors are important in “shaping up of, and sometimes distorting, common perceptions” about obesity. These include the sources of information related to obesity, such as the Internet, (which is the main source of information), followed by the individual’s own history of being obese, the experiences of friends and previous weight-reduction practices. (Covic, Roufeil & Dziurawiec, 2007; Robbins & Judge, 2013).

Limitations of study

Since this study relied on self-reported information, body weight and height might be wrongly estimated, rendering computation of NW, OW/OB incorrect. The anonymous nature of the questionnaire might have assisted in reducing this bias. The use of pictures as a tool in the in-depth interview to stimulate recall might have biased or influenced the responses of the subjects. Finally, the respondents of the online survey and the informants for the in-depth interviews were recruited from different locations, although the inclusion criteria in both studies were similar.

CONCLUSION

The study revealed that Indonesian women with NW and OW/OB attributed obesity to different factors. While NW women identified individual factors, OW/OB subjects tended to attribute obesity to environmental factors. The results of this study may be used for drawing up weight-management strategies or obesity-control programmes. Such interventions should include increasing the awareness and the empowerment of Indonesian women who seek information about obesity. The knowledge of how individual and environmental factors

interact with each other may stimulate changes in the eating behaviour of OW/OB women, which is important in weight-management programmes. Future research should also cover wider geographical, social and cultural contexts, especially among Indonesian women of the low economic status, in order to gauge perceptions on the causes of obesity across a wide spectrum of the Indonesian society.

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Authors’ contributions

FII, contributed to the conception and design of the work, obtained and analysed the data, compiled the first draft of the manuscript, was involved in the critical revision of the draft and approved the final draft; FJ, BS, KH and WA all contributed to the conception and design of the work, obtained and analysed the data, were involved in the critical revision of the draft and approved the final draft.

Conflict of interest

All authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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A qualitative study comparing the coping strategies between food secure and food insecure households of Kaluppini indigenous people in South Sulawesi

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ABSTRACT

Introduction: Food insecurity remains a global challenge, especially among vulnerable indigenous populations. Coping strategies to maintain food security among indigenous groups can be unique and complex, being influenced by cultures. This study aimed to explore the coping strategies employed by food secure and food insecure households in times of food insufficiency, in the Kaluppini indigenous population of South Sulawesi, Indonesia. **Methods:** The study recruited mothers of children aged below 5 years, who agreed to participate in the study's focus group discussions (FGDs) and in-depth interviews. All information was recorded, transcribed verbatim and analysed. **Results:** A total of 61 mothers participated in 22 in-depth interviews and six FGDs. Five coping strategies were used by the Kaluppini people i.e. additional income generation, dietary alteration, access to alternative food sources, access to alternative cash sources, and, traditional ways of coping. Both food insecure and secure households reported making dietary changes, such as reducing consumption or substituting foods, borrowing food or money, and practising traditional coping strategies, such as food sharing after performing rituals. In order to generate income, food insecure households reported seeking additional work in the neighbourhood areas, while food secure households migrated in search of work to the other islands or other countries. **Conclusion:** Food insecure and food secure households changed their diets, borrowed food or money from relatives and relied on traditional coping mechanisms such as food sharing. It is suggested that food insecure Kaluppini households be encouraged to grow essential foods in their gardens to enhance food security.

Keywords: Food security, coping strategies, indigenous people, Indonesia

INTRODUCTION

The second goal of the Sustainable Development Goals of the United Nations is to end hunger, achieve food security and improve nutrition and promote sustainable agriculture, by

2030 (Charlton, 2016). Globally, millions experience food insecurity which is the situation when the availability of nutritionally adequate and safe foods is limited or uncertain (Parnell & Gray, 2014). A marker of food insecurity is

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the prevalence of malnutrition among children younger than 5 years of age (Ghattas, 2014). The most recent data estimated that global hunger increased in 2016 and affected 815 million people, leading to stunting in one out of four children below the age of 5 years (FAO, 2017).

A growing body of research has shown that household food insecurity has adverse health consequences for children (Jackson & Vaughn, 2017). Inadequate intake of nutritious foods lead to malnutrition and poor development outcomes such as deficits in academic achievement, social developmental delays and poorer interpersonal relations (Hannum, Liu & Frongilo, 2014; Wight *et al.*, 2014).

The burden of food insecurity tends to be higher among indigenous peoples than among other people in a given country or region (Egeland *et al.*, 2011). The World Bank reported that indigenous populations are the most marginalised peoples, making them particularly vulnerable to food insecurity (Perry *et al.*, 2006; Montenegro & Stephens, 2006). Studies in New Zealand (McKerchar *et al.*, 2014) and Brazil (Ferreira *et al.*, 2012), reported that indigenous children had higher rates of food insecurity and undernutrition compared with their non-indigenous peers. Similarly, more than one third of the indigenous communities in Malaysia experienced food insecurity that lead to malnutrition (Pei, Appannah & Sulaiman, 2018). In order to survive, food insecure households are known to adopt coping strategies (Usfar, Fahmida, & Februhartanty, 2007). Coping strategies are carried out when people do not have access to enough food, and to escape from food shortages and crises (Schrimpf & Feil, 2012). Strategies that are used to maintain food security among indigenous populations can be unique and complex, often being influenced by customary laws, cultures, and beliefs.

The indigenous population of Indonesia comprises 40–50 million

people (Bappenas RI, 2013). There are few reports on how the indigenous people cope with food insecurity. A study among Ciptagelar people, an indigenous group from West Java, reported that the 31.2% stunting in young children was associated with decreased food availability. A coping strategy implemented by tribes of this population was to build *leuit* (store for food reserves) (Khomsan, Riyadi & Marliyati, 2013).

The Kaluppini people are an indigenous group comprising about 4,000 inhabitants who live in a remote and mountainous area around Mt. Latimojong, in South Sulawesi province, Indonesia. They have retained their traditional culture, and they live on customary land called as *Tana ongko sa'pulo tallu* (the 13 selected areas), which consists of forests and farms. The forests serve as their economic and food reserves, and also for conducting customary ceremonies (AMAN Sulawesi Selatan, 2016). Little is known about how this population copes with food insecurity.

Cultures and traditions play important roles in determining food production among indigenous peoples, and this can have a significant impact on food security and nutritional status (Ezeomah & Farag, 2016). Indigenous peoples face complex challenges in food availability due to their remote and isolated locations (Skinner *et al.*, 2013). Gaining a greater understanding of indigenous peoples and their traditional foods and livelihoods can help address undernutrition by targeting appropriate interventions to them. Specifically, by improving the understanding on how the Kaluppini indigenous population copes with food security, the Indonesian government may be able to improve their well-being through culturally appropriate food and agricultural programmes.

This study aimed to explore the coping strategies adopted by food secure and food insecure households in the Kaluppini indigenous population.

MATERIALS AND METHODS

Study design

This qualitative comparative study was conducted among the indigenous people living in Kaluppini in the Enrekang District, in South Sulawesi, Indonesia. Data collection took place from February 2017 to April 2017.

Data collection

The participants were mothers with < 5 children, and their ages ranged 17-49 years. During recruitment, we collected information on the nutritional status of children below 5 years of age, the caregivers, the household residents (i.e. nuclear or extended family), the number of people in the household, the birth order, the children’s age and sex. The inclusion criteria of the participants were self-identification as Kaluppini people who were living in the Kaluppini area during the data collection period.

The first informant for this study was selected by asking the local midwife, customary leader, or head of village. The next informant candidate was selected by snowball sampling, after asking the previous informants and learning of certain variations and criteria that they had. Each characteristic and variation of the informants were checked so that they

met all selection criteria. Using purposive sampling, the researcher screened and categorised informants into food secure and food insecure households based on their responses to the U.S. Household Food Security Survey Module (US-HFSSM) questionnaire. The informants were then categorised based on the US-HFSSM into food secure (score 0-2) and food insecure without hunger (score 3-7), food insecure with hunger (score 8-12), and food insecure with severe hunger (score 13-18) (Bickel *et al.*, 2000).

Data collection was undertaken through focus group discussions (FGDs) and in-depth interviews (IDIs), using a semi-structured questionnaire (Table 1). The participants chose the location for the interview that was convenient to them and where they felt comfortable. Most interviews were held in the homes of the participants to make them feel more relaxed during the interview. It also allowed them (i.e. the mothers and carers) to look after their children. The participants were interviewed about their household coping strategies when facing food shortage. Each session was conducted both in Bahasa Indonesia (the Indonesian language) and Bahasa Endekang (the Kaluppini language) and lasted for 60-90 minutes. We conducted

Table 1. List of interview questions

<i>In-depth interviews (IDIs)</i>	<i>Focus group discussions (FGDs)</i>
1. What is your opinion about food availability at your home?	1. What is your opinion about food availability at your home?
2. Do you feel a lack of food at your home in the last 3 months?	2. If there is not enough food at home, what do Kaluppini people do to get enough food to eat?
3. If there is not enough food at your home, what do you do to get enough food to eat?	3. Are there any other ways that Kaluppini people could try to help their families to access more food?
4. Are there any other ways that you could try to help your family to access more food?	4. What do you think can be done to make it easier for Kaluppini people to get enough food
5. Does your husband or other family member help to address food shortage at your home? If so, in what ways?	

FGD for each group of households separately. For example, the first FGD was held only among informants from food secure households and the following FGD was only for informants from food insecure households. All interviews were recorded using a digital voice recorder.

Ethical considerations

Ethical approval for this study was granted by the Health Research Ethics Committee of the Faculty of Medicine, University of Indonesia (number 77/UN2.F1/ETIK/2017). Participation was voluntary, and all the informants gave their signed informed consent before data collection.

Data analysis

Preliminary analysis was conducted during data collection after each IDI and FGD was completed. This helped the researcher to ensure the completeness of the information gathered and highlighted any issues that needed to be clarified during further data collection (Creswell, 2013). The recorded FGDs and IDIs were transcribed verbatim and imported to Microsoft Word for the content analysis, where the researcher checked all the transcript files to ensure their completeness. Data analysis was then conducted in three steps: data coding, data reduction, and the drawing of conclusion(s) or verification. The data were analysed both manually and by the Dedoose 7.6.6 computer software.

RESULTS

A total 61 mothers participated in this study (22 mothers in the IDSs while 41 mothers in the six FGDs). Out of the total participants, about half (52.5%) were from food secure households and half (47.5%) from food insecure households. Among the latter, majority (72.4%) were identified as food insecure without hunger, while 24.1% were with hunger and 3.4% with severe hunger.

The characteristics of the participants are summarised in Table 2.

Emerging themes

Overall, the Kaluppini people used five themes emerged as common strategies to cope when food became insufficient. They undertook alternative/additional income generation work, made dietary alterations, accessed alternative food sources during periods of insufficiency, accessed alternative cash sources during critical periods and used traditional ways of coping. Table 3 shows the similarities and differences in coping, indicating that food insecure households applied more coping strategies.

Additional income generation

Most Kaluppini people were farmers. In times of food insufficiency, household members (e.g. husband) took up additional, different jobs to generate income. Food insecure and food secure households reported different ways of generating additional income. Food insecure households would seek additional work in the town or neighbouring areas to cope with the food scarcity situation.

“My husband sometimes looks for an additional job as a carpenter besides cultivating maize and peanuts”
(Mother, 33 years old, wasting and underweight child, extended family, food insecure, IDI)

In contrast, husbands from food secure households did *Ma'sompa* to obtain a better income. *Ma'sompa* means migrating from the village and going out of the country or moving to another island to get a new job. Most of them went to the islands of Papua or Kalimantan as the main destination of *Ma'sompa*, but some also went to work in neighbouring Malaysia.

“My husband went to Sendakan in Malaysia. He has been away for 2 years because of our economic problems” (Mother, 34 years old, normal child, extended family, food secure, IDI)

“I would go abroad if I had less income to support my family’s needs. I could join a company in the logging industry if I migrated to the Papua island” (Husband, food secure, 37 years old)

Food insecure households acted differently to generate income when money became insufficient as explained by one of the informants.

“My husband did ma'sompa before we were married. But now not anymore because there is not enough money to go abroad. If there is money, it's better to just buy food” (Mother, 33 years old, wasting and stunting child, extended family, food insecure, IDI)

Dietary alterations

Some households made alterations to their diet by reducing the amount of food consumed or substituting the usual type of food consumed for cheaper varieties. This involved being frugal, purchasing cheaper food, eating plain rice, processed flour, and cooking *nande*

Table 2. Characteristics of participants and study children

Characteristics	Food Secure HH (n = 32)	Food Insecure HH (n = 29)
Nutritional status of the children, n (%)		
Normal	22 (68.7)	9 (31.0)
Wasting	1 (3.1)	2 (6.9)
Underweight	2 (6.3)	7 (24.1)
Stunting	7 (21.9)	11 (37.9)
Caregiver age (years), n (%)		
17–35	23 (71.9)	13 (44.8)
36–50	9 (28.1)	16 (55.2)
Type of family, n (%)		
Nuclear	14 (43.8)	16 (55.2)
Extended	18 (56.2)	13 (44.8)
Birth order, n (%)		
1st child	9 (28.1)	4 (13.8)
Not 1st child	23 (71.9)	25 (86.2)
Child age, n (%)		
0–23 months	24 (75.0)	17 (58.6)
24–59 months	8 (25.0)	12 (41.4)
Child sex, n (%)		
Male	21 (65.6)	14 (48.3)
Female	11 (34.4)	15 (51.7)
Number of family member, n (%)		
≤ 5	14 (43.8)	6 (20.7)
≥ 6	18 (56.2)	23 (79.3)

Table 3. Similarities and differences in coping strategies between food secure and food insecure households

No	Type of coping strategies	Similarities	Differences	
			Food insecure households	Food secure households
1	Additional income generation		Seek additional work Left from school for working	<i>Ma'sompa</i> (migration)
2	Dietary alteration	Eating plain food, <i>Nande dalle/Nande bettauwe</i> (rice cooked mixed with maize/cassava)	Purchase cheaper food Processing flour	Being frugal lifestyle
3	Access to alternative food sources	Process the <i>gabah</i> stock Looking for food at the forest	Children eat at relative's house Taking food from own stall	
4	Access to alternative cash sources	Borrow money from family Sell the peanuts/maize stock	Draw money from saving	
5	Traditional coping methods	<i>Nande sesa</i> (rice with a side dish of chicken or meat and covered by teak leaves) <i>Sumaro</i> (an activity where people help harvesting and they will get payment) Stocking <i>gabah</i> /peanuts/maize	<i>Ma'kambi</i> (livestock breeder) <i>Ma'tanan uma sa'de bola</i> (home garden)	

dalle (rice cooked with maize) or *nande bettawe* (rice with cassava). Different coping ways were adopted by the food secure and food insecure households. In general, the food secure households would be more frugal and would calculate their food expenditure for a month. Food insecure households would purchase cheaper foods.

“We buy cheaper food that is enough for our family; we buy cheaper instant noodles. It is enough for our family for one meal. I want to buy the better one, but the money was not enough” (Mother, 34 years old, stunting child, extended family, food insecure, IDI)

In general, they ate simple foods, where the food insecure households consumed only plain rice, while food secure households consumed rice and vegetables. However, the coping strategy that was used by all the Kaluppini participants usually involved cooking *nande dalle* or *nande bettawe* so that their rice stores did not run out quickly.

“Sometimes I cook nande dalle. So that our rice doesn’t run out fast” (Mother, underweight and stunting child, 40 years old, nuclear family, food insecure, IDI)

“Well, we just eat plain rice. It is hard to say. If we say it was not enough but just made it enough. Therefore, I do not cook too much” (Mother, 28 years old, underweight and stunting child, nuclear family, food secure, IDI)

When the food insecure households did not have any rice to cook, they would process flour into a traditional cake to feed their children. This coping strategy was only found among food insecure households.

Access to food during insufficient periods

The Kaluppini people used coping ways to obtain food during critical periods of food insufficiency, such as grinding *gabah* (unhulled rice) stock, borrowing rice from relatives, having children eat at a relative’s home, looking for food in the forest or taking food from their own stalls. Both food secure and food insecure households would grind their unhulled rice stock. It was notable that Kaluppini people had a tradition of not selling their rice, which they would store as unhulled rice and grind it when their reserves had decreased. The unhulled rice was stored in their ceilings.

“We do not grind our gabah. We purchase rice first. We save our gabah and later when there is no more money, we will grind the gabah” (Mother, 28 years old, underweight and stunting child, extended family, food secure, IDI)

They sometimes borrowed rice from relatives and paid it back later as rice; however, they only borrowed rice from relatives (mainly parents) to avoid damaging their *Siri’* (pride; personal honour or self-esteem). Sometimes, when there was no more food at home, children would go to a relative’s house (mainly grandparents) to eat, but they would never go to other houses. Another strategy used by food insecure households was to take food from their own stalls.

“So, if we borrow rice, we will return it in the form of rice as well” (Mother, stunting child, 40 years old, nuclear family, food insecure, FGD)

Access to cash during critical periods

When to cash was needed during critical periods of food insufficiency, the Kaluppini people would borrow money

from family members (mainly parents), sell their stored peanuts/maize or draw money from their savings. They would not borrow money or rice from outsiders or from food stalls.

“We never borrow from other people. We only borrow from relatives. We maintain our Siri’ (self-esteem; pride) and do not borrow from our neighbours” (Mother, 33 years old, wasting and underweight child, extended family, food insecure, IDI)

“We usually borrow money, but we do not borrow rice because if we borrow money, we can buy fish or other needs” (Mother, 21 years old, normal child, extended family, food insecure, FGD)

Selling surplus peanuts and maize that are stored is a common coping strategy. After harvesting, people would store these commodities without peeling and store them in their homes or in their ceilings where it would stay warm and remain of good quality.

Traditional coping methods

The traditional methods of coping with insufficient food of the Kaluppini people were related to rituals and seasons. These included consuming *nande sesa* (a food dish), performing the *sumaro* (helping with harvesting), undertaking *ma’kambi* (livestock breeding), and storing *gabah* (unhulled rice), maize or peanuts. When a ritual was performed, people would gather in one place and would donate foodstuffs such as rice and chickens, according to their ability. They would cook and eat the food together. After the rituals, everyone would take a pack of rice with a side dish of meat or chicken covered by *daun jati* (teak leaves). This was called *nande sesa*. Kaluppini people believed that covering the food with teak leaves would prevent the food from getting stale quickly.

Both food secure and insecure households stored unhulled rice, maize and peanuts was mainly related to the need for immediate access to food and cash. The unhulled rice stock was used for immediate access to food while the sale of maize and peanuts provided immediate access to money.

Food secure and insecure households would both take home the *nande sesa*, and this could help them save rice for up to 2 days. In order to enable the rice to last longer, food insecure households would dry it out and later fry it into crackers.

“If there was a ritual, we sometimes bring home a pack of rice with meat covered by teak leaves. Sometimes it is enough to eat for two up to three times” (Mother, 30 years old, normal child, extended family, food secure, FGD)

Sumaro was a traditional coping strategy that was applied by both food secure and insecure households. This involved helping someone to harvest in return for a part of the harvest crop as a fee. The harvest was divided as six parts to the owner and one part for *sumaro*.

“Sometimes my husband goes for sumaro or works as a bricklayer outside Kaluppini. If we think that our food stocks are decreasing, then we will look for sumaro as an additional source of income” (Mother, 33 years old, wasting and underweight child, extended family, food insecure, IDI)

By contrast, *ma’kambi* was only used by food insecure households, who would breed the cows of the relatives or other people who had cows. However, because they had to take care the cows and wait for them to breed to produce calves, this was a long-term option.

“Sometimes we also breed cows. If the cow has calves, we will share the calves. If there are two calves then we will share it equally, one for me and one for the cow owner. But if it is only one, we will divide the result equally” (Mother, 41 years old, wasting child, extended family, food insecure, IDI)

“Sometimes we also raise livestock, take care our relative's cows. But it needs a long time ago to develop” (Husband, food secure, 37 years old).

Besides the traditional coping strategies, *mattanan uma sa'de bola* (growing vegetables in the home garden) was also used by food insecure households. This was mostly used to fulfil their daily needs.

“I intentionally plant vegetables to add food at home and also so that our vegetables are varied” (Mother, 33 years old, wasting and underweight child, extended family, food insecure, IDI)

“I plant vegetables, tomatoes or anything that we can plant ... I plant just for daily consumption” (Mother, 34 years old, stunting child, nuclear family, food insecure, IDI)

By contrast, the food secure households fulfil their vegetable needs by buying from the market.

“I don't plant vegetables. Sometimes we ask vegetables from neighbours. But I usually buy vegetables at the market” (Mother, 28 years old, wasting and underweight child, extended family, food secure, IDI)

DISCUSSION

Households apply different coping strategies to manage food shortages and crises (Balta & Tessema, 2015), but these tend to be modified at both

the household and the individual levels. Coping strategies vary in each community based on their culture and geographical differences (Farzana *et al.*, 2017). The coping strategies applied by indigenous mothers in food secure and food insecure Kaluppini households were consistent with their cultures and traditional beliefs.

In general, husbands played the key role in generating additional income. Husbands from food insecure households would seek additional work from the local area (village), while husbands from food secure households would do *ma'sompa* or abandon the village to work on other islands or even outside the country. The husbands still had the most responsibility for household incomes (Smith *et al.*, 2003). In Zambia, women were responsible for generating additional income by collecting firewood and selling it to townspeople (Schrimpf & Feil, 2012). This became a burden to them and increased their workload, as they were then required not only to take care of their children but also to generate more income to cope with food shortages.

Most households stored their harvest yields in their own homes, as *gabah*, together with maize and peanuts. This finding was consistent with that of other studies in Indonesia, though with differences in where food was stored. Whereas the Kaluppini indigenous people tended to store their reserves hung from the ceilings, the *Ciptagelar* indigenous people stored their unhulled rice collectively in a warehouse of food reserves called a *leuit*. Their food security status was indicated by the amount of unhulled rice in the *leuit* (Khomsan *et al.*, 2013). People from rural East Nusa Tenggara province stored maize in a *rumah bulat*, a separate house used for food storage and as a kitchen (Fatmaningrum, Roshita & Februhartanty, 2016).

Food storage was important to ensure food availability during shortages

or droughts (Dweba & Mearns, 2011). If they had sufficient money, the Kaluppini people preserved their unhulled rice and purchased rice from the market for daily consumption. They would only grind their unhulled rice stock if they did not have enough money to buy rice. When food insufficiency became more dire, or there was no money or food to eat, people tended to borrow money or rice from relatives. This practice has been reported among other rural populations, who borrow rice from neighbours (Fatmaningrum *et al.*, 2016). By contrast, the Kaluppini households borrowed only from relatives (because of *Siri*).

The tradition of sharing is important to many indigenous peoples. According to most traditions, food should be shared rather than sold (Damman, Eide & Kuhnlein, 2008). This sharing tradition is still practised among the Kaluppini people. Every time they performed rituals, they would offer a lot of food that would be shared among those attending. Social networks and food sharing in community feasts enhanced health and well-being among indigenous peoples (Kuhnlein, Erasmus & Spigelski, 2009). This food-sharing practice ensures food availability at home (Chege, Kimiywe & Ndungu, 2015). Skinner *et. al* (2013) reported similar findings in Fort Albany, Canada, where food sharing between families and the among the community was a key coping strategy for food insecurity.

Another coping strategy was *mattanan uma sa'de bola*, or home gardening. This was a positive practice among the food insecure Kaluppini households. They would plant vegetables in their home gardens to meet their daily needs. Many studies have found that home production for family consumption was an important food source in many rural areas (United Nations, 2012). Another benefit of home gardening is that it can ensure continuity of agricultural diversity and can provide a good place for farmers to experiment with domesticating wild plants (FAO,

2015). Therefore, both food secure and food insecure Kaluppini households should be encouraged to establish home gardening to add their available food stocks and to ensure a broader vegetable availability (e.g. eating tubers when food stocks run out or when food prices are high).

Limitations of study

This study involved a large number of informants who participated in both the IDIs and FGDs. They were willing to describe their experiences of times when food was insufficient, something which was a sensitive matter. Another limitation of the study was that the study was conducted during the rainy season, and hence we did not observe food security related practices during the dry season.

CONCLUSION

Both food secure and food insecure households in the Kaluppini indigenous population experienced low food availability, with similarities and differences in how each group coped with these food shortages. The main similarities were in changing their diets, borrowing food or money from relatives and relying on various traditional coping mechanisms. It is suggested that food insecure Kaluppini households should be encouraged to grow essential foods in their gardens to enhance their food security. Public and private agencies should offer appropriate programmes to address the food insecurity problems of the Kaluppini people.

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Authors' contributions

N, compiled the first draft of the manuscript; KA, involved in the critical revision of the draft and approved the final draft; FJ, involved in the critical revision of the draft and approved the final

draft. All authors contributed to the conception and design of the work, were involved in the acquisition and analysis of the data as well as in data interpretation.

Conflict of interest

All authors declare that they have no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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Early development process of drama and storytelling scripts as media for nutrition education on balanced diets among elementary school children

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ABSTRACT

Introduction: The Indonesian Guide on Balanced Nutrition endorsed in 2014, needs to be more widely publicised. One way is to use fun learning methods such as drama and storytelling, especially in schools. This study aimed to develop drama and storytelling scripts for educating students on balanced nutrition. **Methods:** Sixteen focus group discussions (FDGs) with thematic activities were conducted among 96 mother-child pairs in four elementary schools. The mothers' age ranged from 30-50 years and the children 9-13 years. In-depth interviews were conducted with eight teachers (two from each participating school). The FDGs and interviews were designed to elicit information on knowledge and implementation of balanced nutrition guidelines at three levels, namely intrapersonal (students), family (mother) and environment (school teacher). Content analysis was used to identify relevant themes, which were developed into scripts for drama and storytelling. **Results:** The students, mothers, and teachers were not familiar with the general guidelines for balanced nutrition. The lack of variety of the food provided at home was reported. The draft scripts were discussed and modified for accuracy of the nutrition messages that were applied in character dialogues, song lyrics, dramas and storytelling. **Conclusion:** Storytelling and drama are effective for use by teachers and mothers for delivering nutrition messages in schools and the home.

Keywords: Drama, storytelling, nutrition education, elementary school students, Indonesia

INTRODUCTION

The rising prevalence of obesity in children and adolescents has become a critical global health challenge (Wijlaars *et al.*, 2011). In Indonesia, the double burden of obesity and malnutrition are challenging important public health

issues. While undernutrition still exists, the prevalence of childhood and adolescent obesity has emerged as a health concern. It was estimated that among children aged 5-12 years, 10.8% were overweight and 8.8% obese (MOH Republic of Indonesia, 2013).

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Dietary practices and physical activity are key modifiable risk factors that are related to the development of non-communicable diseases. Poor food choices and physical inactivity contribute to problems during childhood and adolescence, such as behavioral problems at school, emotional problems, low academic performance, as well as short-term and long-term health problems (Sahoo *et al.*, 2015). Type 2 diabetes (Bacha & Gidding, 2016), heart diseases (Cote *et al.*, 2013), and psychological health (Beck, 2016) are becoming more common in younger adults as a result of the rise in obesity and overweight.

Schools are a proven effective and efficient environment in which to reach out to most children of school-going age from diverse ethnic and various socioeconomic backgrounds (Van Cauwenbergh *et al.*, 2010). Since schools have the potential to reach and interact with children intensively and continuously, educators and health professionals have identified schools and teachers as having important roles in public health education and health promotion interventions for the prevention of obesity (Calvert, Robert & Rachel, 2019). In addition, Institute of Medicine (IOM) (2012), USA, has suggested five critical areas where schools can act as agents of change. Schools could be the focal point of activities for the mitigation of obesity among children. They may do so by providing physical education and opportunities for physical activities, by ensuring healthy nutritional standards for all food and beverages that are sold or provided there and by providing education in nutrition.

Nutrition education should become an integral part of the school curriculum for elementary school children. Implementing nutrition education is a convenient strategy for influencing children's knowledge of nutrition and

eating practices (Evans *et al.*, 2016). The provision of specific nutrition education has been shown to have multiple benefits, such as the increased likelihood of children having healthy habits at an early age (Wall *et al.*, 2012). These included a decreased risk of obesity among elementary students (Fairclough *et al.*, 2013), an improved cognitive development with a potential to decrease behavioral outbursts in an educational setting (Ickovics *et al.*, 2014), an increased knowledge of nutrition, and decreased body mass index (BMI) and waist circumference amongst elementary students (Fairclough *et al.*, 2013, Evans *et al.*, 2016, Jarpe-Ratner *et al.*, 2016, Wall *et al.*, 2012).

Indonesia has had a variety of programmes for school called the Schools Health and Nutrition programmes (SCN). These have included the *Usaha Kesehatan Sekolah* (UKS, Schools Health Initiative), programmes for water and sanitation at school, basic health center (*puskesmas*), feeding in schools, and other school-based health services provided by non-government organization (Del Rosso & Rina, 2009). Indonesia has had dietary guidelines for the general population, including children. The publication of nutrition messages started in 1950s with the slogan "Four Healthy Five Perfect" (locally known as "*empat sehat lima sempurna*"), which promoted the consumption of staple foods, protein-source foods, vegetables, and fruits, as the "four healthy" food items, and drinking milk for the "five perfect". A study covering 132 elementary school children found that 90% stated that a balanced diet was the "Four Healthy Five Perfect" guideline (Achadi *et al.*, 2010). Over time, new knowledge and facts in nutrition led to the Indonesian government to publish the "Guide to Balanced Diet" in 2014 (MOH Republic of Indonesia, 2014). This publication

included following messages: consume a variety of food, keep clean, exercise regularly, and monitor body weight.

Campaigns on balanced nutrition for children can be delivered through various educational media. However, the challenge is to identify the most effective methods to promote healthy lifestyles to children. The use of storytelling drama, theatre and role-playing are useful methods for health promotion and education. These methods stimulate creativity and critical thinking (Sanchez, Zam & Lambert, 2009). Educational drama emphasizes learning through the dialectics between actual and fictional contexts (Joronen, Rankin & Astedt-Kurki, 2008). This study describes the process used for identifying themes and developing scripts for drama and storytelling for educating elementary school children on balanced nutrition.

MATERIALS AND METHODS

Data collection and procedures

A qualitative research strategy, called phenomenology, was used to gain insight and understanding about the knowledge and practice of balanced nutrition. "Phenomenology attempts to understand the emotions, attitudes, thoughts, meanings, perceptions, and bodily experiences of people, as or after they have experienced a phenomenon" (Harris *et al.*, 2009). Focus group discussions (FGDs) were used to elicit the personal perceptions of a defined area of interest of the respondents through carefully planned, semi-structured and interactive discussion (Flynn, Lauren & Shannon, 2018). Following the ecological model for promoting healthy eating habits in children, the focus groups were organised at three levels that influence the eating behaviour of children, namely, the individual (school children), the family (mother), and the school (school teacher). This approach was

important for developing comprehensive promotional and educational materials (Parvanta *et al.*, 2011).

Four elementary schools of which two were private and two governments were chosen for their sociodemographic diversity. One each of the private and government schools were located in Palembang City, while the remaining private and urban government schools were located in a rural area, called the Pemulutan and Ogan Ilir Regency.

The FGD participants were mother-child pairs. They were selected using a classroom student list to yield a purposeful sample. Access to the boys and girls in the fourth and fifth grades and their mothers, was facilitated by the teachers and the school principal. The participants who were chosen represented a range of sociodemographic backgrounds with respect to age, education level, and occupation of the mothers. Additionally, an in-depth interview was conducted with eight relevant classroom teachers; they were two from each participating school, one from fourth grade and one from fifth grade classroom teacher.

The FDGs and in-depth interviews were conducted at each school based on schedules agreed among school teachers, mothers, and study investigators. The FDGs among children and the mothers were held on the same day in different rooms, and were each led by a member of the research team. The FGD sessions for fourth grade children and their mothers were held in the morning while that for fifth grade children and their mothers after lunchtime. Each FDG lasted approximately 45-60 minutes.

The FDGs were conducted in a manner that allowed spontaneous discussion among students with the study investigators acting as observers and facilitators. They were designed as a thematic activity. The theme for

each activity was intended to explore the knowledge and practice of balanced nutrition, physical activity, learning methods, and hobbies of the students (Table 1).

In order to facilitate sharing during the FGD, photographic prints of foods and activities taken at various locations, and a Styrofoam board and pins, were given to each student. The photographs of snack foods were obtained after face-to-face surveys of the school canteen and food vendors around the schools. Those of staple foods, animal proteins, vegetables, and fruits were obtained from traditional markets and food vendors around the schools. The photographs of outdoor activities, such as traditional games, were obtained from interviews

with community members around the school while those of indoor activities were obtained from interviews with students of other elementary schools with similar characteristics. Students were asked to choose photographs of food and activities based on the FGD theme, pin them on the Styrofoam board and, then, to continue with discussion. Similar FGDs with the mothers were conducted, as described in Table 2.

In-depth interviews with classroom teachers were also conducted in each school after school hours. Teachers were asked about their knowledge of the balanced nutrition guide, the school's efforts to support healthy lifestyle among students, and the school's commitment to implementing a healthy environment

Table 1. Activities during focus group discussions among elementary school students

<i>Sequence of activity</i>	<i>Description</i>
First activity: Setting my food plate photograph	Students were asked to (i) arrange food photographs of what they ate for breakfast, lunch, and dinner one day before the FGD; (ii) to discuss their eating habits, including breakfast habits, fruit and vegetable consumption, and (iii) hygiene practices.
Second activity: Grouping photographs based on like and dislike	Students were asked to explain why they liked or disliked certain foods.
Third activity: Grouping photographs based on healthy and unhealthy foods	In this activity, students were asked to explain their rationale for grouping the photographs and the effect(s) of such foods on their health.
Fourth activity: Collection of photographs of activities performed and grouping them as often- or seldom-performed.	Students were asked to explain the reasons for performing some activities more frequently than others. During this session, the learning methods, hobbies, and favourite cartoon characters of the students were also identified.
Fifth activity: Grouping the photographs based on activity levels, as active or inactive, and providing the rationale for their choices.	In this activity, students were also asked to group the photographs as active or inactive and explain the reason(s) for their choice.
Sixth activity: Sharing their thoughts on a given picture	In this activity, students were shown an illustration of a fat boy watching television while consuming unhealthy snack. They were asked to describe what they saw in the picture and how it related to a healthy lifestyle.

Table 2. Activities during focus group discussions (FGDs) among mothers of the students

<i>Sequence of activity</i>	<i>Description</i>
First activity: Setting my child's food plate photograph	In this activity, mothers were asked to group photographs of foods consumed by their children for breakfast, lunch, and dinner, one day before the FGD. In addition, the researchers explored the mothers' perception of the composition of food consumed by their children, including the habit for having breakfast, as well as the consumption of animal protein, vegetables, and fruits.
Second activity: Choosing photographs of foods liked and disliked by their children.	In this activity, mothers were asked to choose photographs of which foods were liked and disliked by their children. In this session, mothers were also encouraged to discuss the reasons of their preferences.
Third activity: Choosing photographs of physical activity	In this activity, mothers were asked to choose photographs of physical activities based on the frequency of their children's activities, i.e. how often or seldom were they performed.
Fourth activity: Discussion	In this activity, mothers were encouraged to discuss their perception and opinions of the school's roles in creating a healthy school environment and shaping their children's healthy behaviours.

(Table 3). Trained personnel transcribed all the recorded data in verbatim.

Data analyses

A content analysis approach was used to evaluate the data collected from FGDs and in-depth interviews. The field notes of the investigators, from the FGDs with the children and their mothers were collated. Some terms in the local language were translated into *Bahasa Indonesia*

(the Indonesian language) and were identified by footnotes in the transcript. We did not use specific qualitative data analysis software but were aided by Microsoft excel when analysing patterns found in each transcript. The first and second authors independently read the transcript and discussed the codes for all the comments in the FDG transcripts and grouped those that showed similar contents. Themes were extracted from

Table 3. In-depth Interview guide used to stimulate discussion with the classroom teachers

<i>No.</i>	<i>Questions</i>
1.	What do you know regarding current nutrition guidelines that are used in Indonesia?
2.	Based on your opinion, explain how the schools support students to practise healthier lifestyles. What is the school's role in developing a healthier school environment that encourages the implementation of balanced nutrition among the students?
3.	What do you think schools and parents can do to encourage healthier behaviours among students?
4.	How do the teachers and school staff support the achievement of healthy school?
5.	What is the commitment of teacher and school staff in order to achieve healthy school?

these groupings, which represented the main message(s) conveyed by the focus groups. Potential themes were manually generated from the coded data, reviewed, and then labelled by the first and second authors of the study. The review process was repeated until no new themes emerged and a consensus on them was reached.

Script preparation process

The input of the students and mothers that were obtained during the FGDs and the perceptions of the respective teachers through interview were used to identify perceived needs and barriers to healthy dietary behaviour.

The research team consulted a performance expert who was a linguistics professor at the Universitas Sriwijaya (UNSRI) and who was well known for her involvement in many traditional and cultural performances in Palembang. In addition, she was an adviser of the UNSRI theatrical community, called *Garda Anak Bangsa Indonesia* (GABI), which consisted of UNSRI students from its various faculties. The UNSRI also had professional storytellers, who were students of the Faculty of Public Health with experience in performing for children throughout Palembang. Both GABI and the storytelling teams agreed to collaborate in the study by developing scripts and subsequently performing them.

The performance expert suggested that the characters that were developed for the drama should centre around the daily lives of the children, as they were the intended audience. Based on her past experiences, she suggested that for storytelling, the use of a mythical approach for developing the plot, would be preferred by the children. She explained that listening to or watching mythical tales would create an enthusiasm among young audiences which would transform

the moral(s) of the stories into life values and the possible adoption of healthy habits. The research team discussed these suggestions from the performance expert and the themes with GABI and storytelling teams.

Ethical approval

The study was conducted according to the International Ethical Guidelines for health-related research involving humans (CIOMS, 2016). The Ethics Committee of the Faculty of Medicine, Sriwijaya University approved the study. The local authorities and the Ministry of Education also gave written approvals which were then forwarded to selected schools. Written informed consent was obtained from parents (mothers) and teachers before the conduct of the study.

RESULTS

Between April-May 2017, the research team conducted eight FGD sessions with 96 mothers, eight FGD sessions with 96 students, and in-depth interviews with eight teachers. Each FGD comprised six participants. Table 4 shows the characteristics of the participants. The FGDs and in-depth interviews were conducted in the local language and were recorded after written consent from all the participants. The findings from these activities are reported under the following major topics. In addition, we also describe the development and production of drama and storytelling.

Findings from the exploratory study

Nutrition knowledge

In all the FGDs, the most of the children from urban areas could identify and distinguish, with an explanation, between healthy and unhealthy foods, by grouping the pictures provided by the research team.

Table 4. Description of the characteristics of the FGDs participants.

Description	Rural setting		Urban setting	
	Private school 1	Government school 1	Private school 2	Government school 2
Students				
Number of FGDs held	2	2	2	2
Size of each FGD, n	6	6	6	6
Age, n				
9 years	0	4	4	4
10 years	6	6	3	2
11 years	5	2	4	6
12 years	1	0	0	0
13 years	0	0	1	0
Sex, n				
female	8	10	6	6
male	4	2	6	6
Mothers				
Number of FGDs held	2	2	2	2
Size of each FGD,	6	6	6	6
Age range,				
30-35 years	1	4	0	5
36-40 years	3	3	8	6
41-45 years	5	4	4	1
46-50 years	3	1	0	0
Educational attainment,				
Elementary	0	8	0	0
Junior high	0	3	1	0
Senior high	2	1	6	2
Diploma	1	0	1	3
Bachelor degree	0	0	3	6
Postgraduate degree	0	0	0	1
Occupation,				
Housewife	5	6	10	8
government officer	4	0	1	1
Others	3	6	1	3

“Colourful ice is not healthy because it contains artificial colour and sugar” (Grade 4, Government school, urban area)

“It contains high amount of sugar” (Grade 5, private school, urban area), and *“Fruits and vegetables*

are healthy because they contain vitamins” (Grade 4, government school, urban area)

Some students could name the vitamins contained in fruits and vegetables but could not explain their benefits.

“Orange contains vitamin C and carrot contains vitamin A” (Grade 5, government school, urban area)

“I don’t know for sure what the function of vitamin C is” (Grade 5, government school, urban area)

Many children also mentioned that unhealthy foods could affect their health.

“Eating colourful ice and oily food can cause cough” (Grade 4, government school, urban area)

In contrast, many children in the rural area schools provided confusing responses in attempting to distinguish between healthy and unhealthy foods.

“Tango (brand name of chocolate wafer) is healthy food because it contains milk...milk is a healthy food”

Many children also mentioned that unhealthy foods could affect their health.

“Don’t eat candies and chocolate too much...it can cause toothache” (Grade 5, private school, rural area)

The slogan “Four Healthy Five Perfect” was widely known and continues to be remembered by most mothers from both urban and rural areas. However, many were unaware of the latest Indonesian guidelines for balanced nutrition.

“I just remember slogan Four Healthy Five Perfect” (mother, urban area)

“I am not familiar with the new guidelines” (mother, rural area)

The nutrition knowledge many mothers was still based on the old slogan.

Food variety

Even though the students could differentiate between healthy and unhealthy foods, the food-plate pictures showed that, in practice, most children ate unhealthy foods quite regularly, both at school and at home. When asked to name their favourite food, the majority mentioned snacks such as chips, ice cream, chocolates, fried meatballs, sausages, and other snacks, because they tasted good and were savoury.

“I bought pop ice and chocolatos at school (pop ice is an instant drink that comes in multiple flavours and contains an artificial sweetener; ‘chocolatos’ is sugary snack in a form of chocolate roll stick)” (Grade 4, government school, rural area)

Many children reported that their daily meals consisted of carbohydrate and protein as the main items while fruits and vegetables were often absent.

“I ate white rice, milk, and squid for lunch” (Grade 5, private school, urban area)

“My mom only cooked rice and fish for breakfast” (Grade 4, private school, rural area)

“I ate rice with instant noodles and eggs for dinner” (Grade 5, government school, urban area)

“Last night I ate rice and fried chicken” (Grade 5, government school, urban area)

In FGDs held in the rural areas, most mothers mentioned the limited availability of fruits and vegetables, and to find more variety, they had to go to fresh-food markets which were located quite far from their home.

“I buy fruits and vegetables from the seller who comes to our village every day by motorcycle but fruits and vegetables that he brings are limited” (household mother, rural area)

“Rice is the first food that I buy before fish or vegetables” (government officer, rural area)

“My children only like certain vegetables like carrots and spinach” (lecturer, urban area)

Some mothers in the urban areas said that they preferred preferred simple dishes in the morning for breakfast;

“Instant noodle and pempek (savory fishcake delicacy, originally from Palembang, made of fish and tapioca served with a rich sweet and sour sauce called cuko) are our favorite breakfast” (government officer, urban area)

Access to food

All the children in the urban and rural areas said that they had access to school stores, canteens, and food vendors outside schools, all of which offered items that were low in nutrients but high in fat, salt and sugar. They received a daily pocket money from their parents, which varied from 5000 - 25000 rupiahs (15,000 rupiahs = US\$1). Most of this money was spent on buying food sold around their schools or near their homes. The foods they bought were usually sweet or sugary snacks/drinks for example:

“I often buy potato chips and iced tea outside school during the first break” (grade 4, rural area)

“I like to eat grilled sausages and pop ice” (grade 5, urban area)

Most mothers agreed that it was difficult to control what their children ate outside the home. They also agreed that schools should have an influence on what their children eat while at school.

“The school should be a part of what’s going on, and teachers should act as parents at school”

“Teachers should educate students on which food should be consumed and which should be avoided” (mother in rural area)

Physical activity

Almost all the students from middle and upper income families reported that they frequently spent their leisure time in sedentary activities, such as watching television and playing games using gadgets.

“I love playing games on my tablet, my favourite is Craft and Attack on Titan” (Grade 5, private school, urban area)

Some of them said that they had personal gadgets such as android mobile phones or tablets. Private school students also mentioned spending a lot of time on screen-based activities.

“I have a Facebook account. Chatting on the phone and updating my status on Facebook make me inactive” (grade 4, private school, urban area)

They preferred to play at home rather than to participate in outdoor activities. The structure of the school system and academic workload were frequently mentioned as barriers to activity among private school students.

“After I arrive home in the afternoon, I am too tired to do sports” (grade 5, private school, rural area)

Students from the low income families reported spending more time doing outdoor activities, such as playing soccer, cycling, fishing, and climbing trees.

“I don’t have a smartphone, so after school I play soccer with my friends” (grade 4, goverment school, rural area)

The schools offered only a single sport education class a week and limited physical activities after school. The lack of opportunities for engaging in physical activities at school, was a common reason mentioned in all the FGDs among the students. Limited sport facilities, the lack of qualified sports teachers/coaches (only one sports teacher in school), and lack of role models were other reasons for the lack of physical activity. The girls felt that they had fewer physical activity options available at school compared to the boys.

Ability to provide food

Non-working mothers in rural areas stated that rice was the main staple food but revealed that the food they provided lacked variety. The reason was financial, and other foods such as animal protein and fruits could only be bought after they had received their earnings from weaving fabric. The major sources of protein were eggs, *tempe* (fermented soybean cake), tofu, and fish (either caught or bought). The majority of mothers usually bought animal products, vegetables, and fruits from mobile vegetable vendors who visited the village regularly. This was an advantage as they did not need to go to markets which located far from their home, and also they could buy in smaller quantities. However, because of the limited variety of food items sold by the mobile vegetable vendors, this resulted in a lack of variety in the foods prepared at home. In contrast, working mothers

from middle and upper socioeconomic status were able to provide animal products, vegetables, and fruits, without problems.

School policy and teacher’s role

Based on in-depth interviews with the teachers, it was found that two participating public schools did not have their own school canteen. The teachers revealed that the schools could not prevent their students from buying snacks from vendors outside the school.

“Students often buy snacks outside school because we don’t have a canteen” (teachers, government school)

They said that, at best, they could only remind the students not to buy snacks from outside the school. Importantly, a majority of the teachers were unfamiliar with the latest government guidelines for balanced nutrition. On the other hand, all the private schools had their own school canteen, and their students were not allowed to buy snacks outside the school. However, the schools did not control the foods and beverages that were sold in the school canteen. We found that the canteens sold packaged foods and beverages, such as flavoured powdered drinks, chips, wafers, and chocolates. The schools also admitted that they had not been able to monitor the food and drinks that were sold in the school canteen.

Script development and production

Based on the results of the FGDs and in-depth interviews, the drama and storytelling scripts were drafted by the GABI team and the story-telling team, respectively.

A drama titled “POLISI” (an acronym for *Pola Hidup Sehat dan Makanan Bergizi*, which translates to “Healthy Lifestyle and Nutritious Food”) and a

story titled “Nino and the Magical Tree” were finalised. The synopses for the story and drama are provided in Table 5. The content of the scripts was developed based on themes that emerged from the FGDs and in-depth interviews. For example, based on FGDs with children, we found that they lacked of physical activity and eat unhealthy food that they bought in the school environment. We created a story plot to describe that situation and give recommendations to change it. The research team also added key nutritional behaviours on balanced nutrition that were packaged as 10 messages. These were behaviours that were found wanting during the exploratory study, such as the consumption of a variety of foods, plenty of vegetables and fruits, having a regular breakfast, the need for proper hand-washing, and undertaking regular physical activity. These guidelines were used to replace the older guidelines of “Four Healthy Five Perfect” (*empat sehat lima sempurna*).

Taking into consideration the attention span of the school children, who were the main targets of the drama and storytelling sessions, both the performing teams decided that the drama should last for about 50 minutes and that the storytelling session for about 30 minutes (including an interactive session with the audience). The performances of these two nutrition education media were scheduled for one weekend at the GABI Theatre Room in Palembang. Prior to that, regular rehearsals were conducted twice a week for three weeks and daily intensive rehearsals were conducted for five days prior to the show. The impressions of the audiences of two media events for nutrition education will be presented as a separate paper.

DISCUSSION

Health communication strategies have been used to inform and influence individual and community decisions to enhance health (Parvanta *et al.*, 2011). Increasingly, however, health communication developers are turning to narrative forms of communication like entertainment education, storytelling, and testimonials to help achieve these same objectives. Narrative is a key communication strategy as human beings are all storytellers (Gray, 2009). Storytelling has been a method for human beings to organise experience and ideas, communicate and create understanding with the purpose of educating and inspiring the cause-effect relationship between events in particular time. Storytelling has a power to explain a condition, topic or problem to attract and sustain interest, and to form meaningful connections with audiences (Sundin, Karolin & Robert, 2018). This type of education is realistic and applicable to classroom teaching.

Changes in health and nutrition behaviour may be achieved through education within the school setting (Lee, 2009). School-based nutrition education should take into consideration the needs and interests of the students, teachers and the school, be culturally appropriate and be delivered in ways that the children can understand healthy eating habits (Wilson, 2009). Based on the ecology theory (Parvanta *et al.*, 2011), there are three domains that influence the eating behavior of children. These are at the levels of the individual (children), the family (mother) and the environment (represented by school teacher). An important element in the early stages of preparing nutrition messages through drama and storytelling was the identification of their perceived needs and barriers in the implementation of

balanced nutrition by FGD. The FGD results have provided information on the knowledge among young school children of balanced nutrition guidelines and how their environments (i.e. their mothers, the schools, and teachers) have influenced the eating practices of the children.

Studies in Australia have revealed that parents are not always capable of choosing healthier foods because they lack adequate knowledge and also because they are misled by the information provided through the marketing practices of food companies (Jones, Robinson & Kervin, 2011). We found a number of consistent themes among mothers and students both in rural and urban areas. In general, mothers in rural and urban areas were not familiar with the latest public guidelines on balanced nutrition that were published in 2014. Instead, the “Four Healthy Five Perfect” slogan that was introduced in 1952, was still the predominant guideline referred to by the general public. That slogan had stated that milk was the perfect food that could compensate for non-consumption of all other foods. This was strongly believed by mothers. The fundamental differences between the “Four Healthy Five Perfect” slogan and the new guidelines on balanced nutrition lie in the four new principles, which are food diversity, personal hygiene, physical activity, and control of body weight (MOH Republic of Indonesia, 2014).

The present study found that the intake of fruit and vegetables by students at mealtime is inadequate. The choice of food that is consumed is influenced by factors such as

tastes, colours and textures. Sugary snacks and drinks were preferred by the children. Such foods are easily available at school or from food vendors around their home. They easily access such foods as they are given daily pocket money by their parents.

Schools should be part of the solution of this issue. Providing regular nutrition education and nutritious and balanced meals through a school meal programme has been shown to enhance the knowledge and desire of students to choose right foods for their health (Park, Je-Hyuk & Myung-Hee, 2015). The role of the schools can be improved through the UKS “School Health Programme”, wherein one of three pillars is health education on nutritious foods for the students. Unfortunately, the implementation of the UKS has been unsatisfactory. As a result, the government has transformed the UKS programme to create a healthy school environment. This, in turn, can help to prevent non-communicable diseases in children from an early age.

School policy should be backed with proper resources to address health and nutrition behaviour. Such policies would be more effective if they were disseminated by educators with experience in the field. Schools should also be permitted to investigate the foods and beverages that are available to students at canteens or food vendors located near the schools and take appropriate action if they are deemed unsuitable.

Schools should be provided with adequate time and other resources to develop health promotion tools to carry out changes. However, the resources

Table 5. The synopses of drama and storytelling

<i>Type</i>	<i>Synopsis</i>
Drama	<p>Gita has a mother who cares about the health of the family. Her mother always serves homemade food for Gita and her father. Gita's mother is a role model for other mothers in the neighbourhood. She often shares information with her friends on how to apply the concept of balanced nutrition in the family's diet, increase the variety of the food that is provided, counsel children who do not like vegetables, and choose healthy snacks.</p> <p>Gita has several close friends in school who have different lifestyles. Shinta is an obese girl who likes eating candies, ice cream, chips, and other snacks a lot, while Lala is a lazy girl who likes to buy unhealthy snacks that are sold around the school every day. Bimo loves to play with gadgets. Gita often advices her friends about healthy eating habits and an active lifestyle.</p> <p>One day Gita invites her friends to bring their own lunchboxes to school. Gita asks her friends to open their lunch box together. Surprisingly, most of the foods inside the lunch box were unhealthy. Gita explains that they should eat a variety of foods, vegetables and fruits because they contain a lot of nutritious substances. Gita discusses with her friends that consuming too much high-energy foods, combined with sedentary lifestyles, may result in excessive weight gain. The teacher hears their discussion, approaches Gita and her friends, and brings along big poster of the Indonesian food pyramid called "Tumpeng Gizi Seimbang" on balanced nutrition guidelines. She concludes the show by articulating all 10 messages in the nutrition guide that include what and how much we should eat every day, and the need for having an active, healthy lifestyle.</p>
Storytelling	<p>The Mikimo village is inhabited by magical dwarves who speak and live like humans. They are unique in their own way and are endowed with certain blessings that will remain with them only if they do not violate the rules of the Gods. The Mikimo village is famous for its fertile vegetable and fruit plantations and the habits of its people who follow a healthy lifestyle. They have a varied diet and love the vegetables and fruits that they consume every day. They also do not forget to have breakfast before gardening or doing other activities. Washing of hands is obligatory before and after meals.</p> <p>One day, a small dwarf named Nino missed his breakfast because he was in a hurry to go to Uncle Maden's carrot garden. Suddenly, Nino got a warning from God. At the time of pulling the carrots, he is swallowed into the ground. He then sees the old banyan tree that turns out to be the God Nirvana. God Nirvana then reminded Nino not to skip his breakfast again.</p> <p>In ancient times, the dwarves used their magical powers arbitrarily. They created so much cake, candies, chips, chocolate, that they overate and became too lazy to work. They did not like to have breakfast or eat fruits and vegetables, and so they became fatter, and finally died. They also never washed their hands before and after meals so they were often infected with diseases. Therefore, God Nirvana and the Chief of the tribe drew up some rules. These were to always eat nutritious foods, consume fruits and vegetables, have breakfast, and wash hands before and after meals.</p> <p>Nino regretted what he had done and promised to obey God Nirvana's rules so as to continuously maintain a healthy lifestyle.</p>

for developing and sustainably enacting these performances on nutrition education for school children need to be expanded as a variation of interactive nutrition education tool. The use of the performances arts such as drama and storytelling has the potential for conflict with the duties of the teachers. However, its short duration fits with the limited time teachers are provided for nutrition education.

Finally, although models of health-behaviour change like social cognitive theory, precaution adoption process model, and the theory of reasoned action have been applied and evaluated more extensively in health-behaviour research, their application to communication by narrative means has been limited. Most research on narrative effects has been conducted in the fields of communication and psychology, not in health-behaviour research, let alone nutrition behaviour.

CONCLUSION

This study showed that drama and storytelling performance should be based on the assessment of the eating environment of the children. Drama and storytelling are appropriate due to its relatively short duration, which fits with the limited time that school teachers are provided for nutrition education. Storytelling also applicable for parents because it is a simple method of delivering nutrition messages in a home setting. Future research should be conducted to collect data at baseline, during and post-intervention to confirm the effectiveness of these tools.

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Authors' contributions

DS, led the data collection and compiled the first draft of the manuscript; EF, led the data collection. All authors contributed to the conception and design of the work, were involved in the acquisition, analysis and interpretation of the data, critically revised the draft and approved the final draft.

Conflict of interest

We declare no conflicts of interest.

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