

WeChat can be a potential way to deliver infant and young child feeding recommendations in rural areas in China: A mixed quantitative and qualitative study

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Abstract

Background Appropriate infant and young child feeding practices are the basis for child nutrition, which can be influenced by mothers' exposure to health promotion messages. In China, WeChat is gradually changing the channels people receive information. This paper aims to explore the feasibility of using WeChat as an intervention to improve Infant and young child feeding in rural China.

Methods A mixed-methods study was carried out in Huzhu County, Qinghai province, China. Quantitative data were from two cross-sectional surveys with children aged 6-23 months and their caregivers to collect feeding knowledge and practices, caregiver's use of smartphones and WeChat in 2012 (N=1804) and 2018 (N=754), respectively. Qualitative data were from 33 semi-structured interviews with pregnant women and mothers. In addition, we developed a WeChat feeding health education platform and asked women for their using experiences.

Results In both surveys, less than 10% of caregivers knew that breastfeeding can be continued up to two years, less than 50% knew the accurate duration of exclusive breastfeeding, and only around 20% knew meat should be given to children from the age of 6-8 months. Similarly, the feeding practices were suboptimal and most key infant feeding practices did not change over the years. In both surveys, only around 30% of caregivers ever received feeding information during pregnancy or after delivery. Among them, around 50% of caregivers received from their relatives and friends, followed 30% from health facilities and communities. More than 80% of mothers were currently using both a smartphone and the WeChat app. Mothers could easily access the internet on their smartphones (90.8%), as WiFi was available at home or at the workplace. Furthermore, 75.4% of them were willing to receive feeding information from WeChat official accounts. The WeChat feeding health education platform was generally accepted by pregnant women and mothers.

Conclusions Caregivers' feeding knowledge and practices were poor in Huzhu County, and there was an absence of accurate information sources on infant feeding and child nutrition. WeChat could be a potential way to deliver infant feeding recommendations to mothers in rural China.

Background

Appropriate nutrition in the first few years of life is extremely important to childhood growth and development, and has lasting effects on children's future health [1]. The critical window for child nutrition is within the first 1,000 days between conception and the age of two, and any nutritional deficits (such as anemia and stunting) acquired during this period can cause irreversible damage [2, 3]. The promotion of appropriate feeding practices could reduce the incidence of stunting and lead to better health and growth outcomes [4, 5]. Therefore, the World Health Organization (WHO) and United Nations Children's Fund (UNICEF) recommend exclusive breastfeeding from birth to six months of age followed by the introduction of adequate complementary foods at six months and continued breastfeeding for up to two years [6].

During the past two decades, the Chinese government has made great efforts to improve infant and young child feeding by using the UNICEF infant and young child feeding (IYCF) guidelines [7] and the WHO integrated management of childhood illness (IMCI) guidelines in nutrition programs [8]. Also, many hospitals have been made baby-friendly to promote breastfeeding and breastfeeding week activities were organized to raise public awareness of breastfeeding [9–11]. Moreover, a national program called “Basic Public Health Service” has been implemented in China since 2009, in which health care workers are required to provide face-to-face breastfeeding and complementary feeding counseling to pregnant women and mothers throughout antenatal and postnatal care [12]. However, the exclusive breastfeeding rate of babies aged up to 6 months was only 18.6% in China in 2013 and the prevalence of minimum dietary diversity, meal frequency and acceptable diet among children aged 6–23 months was 53.7%, 69.1%, and 25.1%, respectively [13]. In addition, too early or too late introduction of complementary food is very common; around 20% of children younger than 4 months in poor rural areas were given complementary food, and 15% were introduced to complementary food they were older than 9 months [13].

Women’s knowledge on infant feeding practices is crucial for the health and nutrition wellbeing of a child, which can be improved by healthcare education messages [14–16]. Currently, infant and young child feeding counseling have generally implemented through the rural three-tier healthcare system (county-township-village) in China [12]. However, caregivers in rural areas receive feeding information mainly from family members, friends or their own experience [17–19], and rarely from health facilities. Thus, child feeding education need to be enhanced and exploring effective ways to promote feeding practices is greatly needed.

With the widespread use of smartphones, interventions delivered through smartphone apps have been increasingly used for health promotion, such as for providing education on antibiotics [20] or diabetes [21], reducing alcohol consumption [22], smoking cessation [23], or to improve diet, physical activity and reduce sedentary behaviour [24]. In China, the most popular smartphone app is WeChat (Tencent), which is regarded as one of the leading social networks worldwide. Founded in 2011, WeChat has 902 million daily users, and about 38 billion messages are sent on the platform every day [25]. Furthermore, in addition to messaging, WeChat offers users functions such as video calls, sharing photos and ‘moments’, games, payment, booking flight or hotels. And one of the most popular functional modules of WeChat called ‘WeChat official accounts’, which can be used for developers, merchants, celebrities, and organizations to communicate and interact with their audience through text, images, voice, videos and rich-media messages [26]. WeChat is gradually changing the channels through which people receive information, and has been used as a communication tool to change health behaviors, which has shown potential positive impacts on disease management of cancer [27], malaria [28], asthma [29], chronic rhinosinusitis [30], diabetes [31] and weight loss [32]. However, no studies have focused on using WeChat to support caregivers with infant and young child feeding.

The study reported in this paper is part of a controlled intervention trial evaluating the effectiveness of complementary food supplements (Ying Yang Bao, YYB) and dietary counseling on nutrition of children

aged 6–23 months in rural areas in Qinghai province, China [33]. This current paper explores the feasibility of interventions delivered by WeChat to improve infant and young child feeding in rural China.

Methods

Study design and data sources

Mixed methods were used to explore the feasibility of interventions delivered by WeChat to improve infant and young child feeding Huzhu County, Qinghai province, China. .

Quantitative data were derived from two cross-sectional surveys: a baseline survey in August 2012 [33] and a follow-up survey in August 2018. Caregivers who had a child aged 6-23 months were interviewed in both surveys, which aimed to assess caregivers' infant feeding knowledge and practices, information sources, and use of smartphones and WeChat.

Qualitative data were derived from 33 interviews with pregnant women in their second and third trimester and mothers who had a child aged 0-6 months. These interviews were conducted in August 2018 to obtain a better understanding of mothers' child feeding knowledge and the feasibility of using WeChat as an IYCF intervention. We integrated quantitative and qualitative data to provide insights into the feasibility of implementing the intervention. We first report quantitative data followed by qualitative data on infant feeding knowledge and practices, information sources and WeChat use.

Study setting

This study was conducted in Huzhu County, Qinghai Province, China [33]. Qinghai province lies in northwest China, with a total population of 5,838,000 in 2017. There are 34 counties and 439 townships in Qinghai Province. Huzhu County, located in the northeast of Qinghai province, has a total population of 401,540 of which the rural population accounts for 76.0%. Huzhu County has 19 townships and 294 villages. The annual per capita income of rural residents in 2017 was ¥9810 (US\$1414.91) [34].

Quantitative sample size and sampling

In the baseline survey in 2012, we estimated a sample size of 1793 and used the Proportional to Population Size (PPS) sampling method, which was previously reported in detail [33]. We first selected 150 villages from the county by using PPS method, and then randomly selected 12 children aged 6-23 month and their caregivers from each sampled village for interviews.

For the follow-up survey in 2018, the sample size was calculated based on data from the baseline survey [33]. We expected to achieve a 20%-point reduction of anemia prevalence and 20-50% points increase for knowledge and appropriate feeding practices. With 80% power and 5% significance level, we estimated

that a sample size of 554 children aged 6-23 months would be sufficient for all key indicators. We over-sampled 30% of children to compensate for possible refusal and loss to follow-up. We randomly selected 38 villages from the 150 villages and surveyed all eligible children aged 6-23 months in those villages.

Quantitative data collection

We used the adapted Maternal, Newborn and Child Health household survey (MNCH HHS) tool to collect quantitative data, which included socio-demographic characteristics, infant and young child feeding and common illnesses. In addition, we also collected caregivers' use of smartphones and WeChat during the follow-up survey in 2018. We set up all the questionnaires in the specially developed software on smartphones, which interviewers used to record data [35]. Staff from the Capital Institute of Pediatrics in Beijing acted as supervisors in both surveys, and students were recruited from the School of Public Health, Qinghai University (for the baseline) and Qinghai Institute of Health Sciences (for the follow-up) as interviewers. Two days' training for each survey was carried out before the fieldwork, including communication skills, explanation of questionnaires, demonstration, role plays, field practice, and group discussions. During each survey, we asked caregivers first to come to register at village clinics, then interviewers introduced the aim of the survey, obtained written informed consent and conducted interviews with caregivers.

Quantitative data analysis

Data were automatically transferred into a Microsoft Excel sheet. After data cleaning, we converted the database into a database file (dbf) for the analysis. We carried out statistical analysis with SAS 9.2 for Windows. The median (Q1, Q3) is used to describe the age in years of mothers and grandparents. Percentages are presented for binary or categorical variables. We used the Pearson χ^2 -test and Fisher exact test to compare binary or categorical variables.

Five core feeding practice indicators were used to assess feeding practices according to the WHO guidelines 'Indicators for assessing infant and young child feeding practices' [36].

The feasibility of using WeChat as an IYCF intervention was mainly assessed by smartphone and WeChat usage coverage among caregivers, and caregivers who were willing to receive IYCF information from WeChat official accounts.

Qualitative semi-structured interview participants and sampling

The participants in the interviews were independent of the surveys. We assumed that pregnant and mothers may well accept WeChat as an IYCF intervention, therefore pregnant women in their second and third trimester and mothers who had a child aged 0-6 months were recruited for semi-structured interviews. Based on our previous data, only around half main caregivers of children aged 6-23 months were mothers, we did not include mothers of children aged 6-23 months in the qualitative semi-structured interviews. We used convenience sampling to select participants in Huzhu County.

The WeChat feeding health education platform

Before conducting the qualitative interviews, the study team developed a WeChat feeding health education platform on the local WeChat official account “Huzhu County Maternal and Child Health Family Planning Service Centre”, which has describe in detail in our previous paper [34]. The *feeding lecture classroom* module of the WeChat platform can provide key breastfeeding knowledge and recommendation, breastfeeding problems encountered for both mother and child in the form of text, videos, and pictures. In addition, users can enter data on weight and height of their children on the *Baby Growth Chart* module of the WeChat platform whenever they want to monitor their children’s growth.

Qualitative data collection

One researcher from the Capital Institute of Pediatrics conducted the interviews. The study team developed the interview guides to understand women’s views on exclusive breastfeeding, their sources of feeding information, smartphone and WeChat usage. In addition, we also asked each pregnant woman and mothers to use the WeChat feeding health education platform and asked them for their experiences on use and satisfaction (Supplementary file). Pregnant women and mothers were invited to village clinics to participate. Interviews were conducted in Mandarin, typically lasting for around 60 minutes, and were digitally recorded with the permission of each participant. Tape recordings were transcribed verbatim in Chinese by five medical students from Qinghai Institute of Health Sciences, and then the study team member who conducted the semi-structured interviews validated the transcripts.

Qualitative data analysis

Content analysis was used to examine the major themes and patterns that emerged from the data. Two Chinese researchers involved in the study (WQ and HYW) first read the transcripts and used MAXQDA 11 to identify themes independently. Then the researchers compared the themes and discussed areas of agreement and discrepancies. They further refined the themes until consensus was reached on the themes and interpretation of the findings. We listed all the key themes that we identified.

Results

Participants in the surveys

A total of 1804 caregivers of children were surveyed in the 2012 baseline survey and 754 in the 2018 follow-up survey. In both surveys, mothers and grandparents were the main caregivers, accounting for around 50% and 45% respectively (Table 1). For the 6-11 months child age group, more than 65% of main caregivers were mothers. Mothers who attended junior high school or above increased from 59.8% at baseline to 79.0% at follow-up ($P < 0.001$) and only 4.0% of mothers were illiterate in 2018. The illiteracy rate for grandparents decreased over time but was still very high; 69.1% in 2012 and 60.3% in 2018, and this decrease was not significant ($P = 0.057$).

Tables

Table1 Children's main caregivers and their education in both surveys

	Baseline survey (2012)			Follow-up survey (2018)			P-values*
	6-11 months (N=610)	12-23 months (N=1194)	Total (N=1804)	6-11 months (N=247)	12-23 months (N=507)	Total (N=754)	
	givers						
er	65.6	46.9	53.2	66.4	40.0	48.7	
lparents	33.9	50.7	45.0	27.5	55.6	46.4	
r	0.0	0.9	0.6	6.1	4.2	4.8	
	0.5	1.5	1.2	0.0	0.2	0.1	
years 1(Q1, Q3))	25 (23, 30)	26 (23, 30)	26 (23, 30)	28 (26,31)	29 (26, 32)	29 (26, 31)	<0.001
on, % (n)*							<0.001
ate	14.1	14.7	14.5	3.7	4.2	4.0	
ry school	21.4	24.0	23.1	12.2	14.5	13.8	
high school	52.6	48.9	50.2	58.9	57.4	57.9	
high school	9.9	9.4	9.6	24.0	19.7	21.1	
l or above							
ot know	2.0	3.0	2.7	1.2	4.2	3.2	
ents							
years (median	50 (46, 55)	52 (48, 58)	51 (47, 57)	52 (49, 57)	54 (51, 59)	54 (50, 59)	<0.001
on, % (n)							0.057
ate	66.7	69.9	69.1	57.3	61.0	60.3	
ry school	19.8	17.5	18.1	26.5	21.6	22.6	
high school	12.5	10.3	10.9	16.2	14.9	15.1	
high school	0.5	1.5	1.2	0.0	1.4	1.1	
ot know	0.5	0.8	0.7	0.0	1.1	0.9	

* Baseline vs follow-up for the 6-23 months age group.

Participants in the interviews

A total of 17 pregnant women in their second or third trimester and 16 mothers who had a child aged 0-6 months participated in the interviews. The median age was 29 (ranged from 18 to 45) for pregnant women and 31 (ranged from 23 to 40) for mothers. Most of pregnant women and mothers attended junior high school or above, with four of them only attending primary school and two being illiterate. Five pregnant women and two mothers had a job, such as being a teacher, technician, or commercial service worker, and the others stayed at home for housework.

Caregivers' infant and young child knowledge and practices

As shown in Table 2, caregivers' feeding knowledge was still poor despite having improved over the years. Less than 10% of caregivers knew that breastfeeding could be continued up to two years, less than 50% of caregivers knew the accurate duration of exclusive breastfeeding, and only around 20% of caregivers knew to start feeding children with meat from the age of 6-8 months. Similarly, infant feeding practices were suboptimal and mostly did not change, except for children who were given iron-rich or iron-fortified foods, which increased from 41.5% at baseline to 70.9% at follow-up ($P < 0.001$). Although more caregivers ever received breastfeeding and complementary feeding information during pregnancy or after delivery at follow-up than at baseline ($P < 0.001$), the proportion was only around 30%.

Table 2 Caregivers' infant and young child feeding knowledge and practices in both surveys

Indicators	Baseline survey (2012)			Follow-up survey (2018)			P-values
	n [†]	N [‡]	Percentage (%)	n*	N [§]	Percentage (%)	
	Knowledge						
Mothers knowing the duration of exclusive breastfeeding	336	1804	18.6	298	754	39.5	<0.001
Mothers knowing continued breastfeeding until 24 months	42	1804	2.3	47	754	6.23	<0.001
Mothers knowing introduction of complementary feeding at 6-8 months	779	1804	43.2	485	754	64.3	<0.001
Mothers knowing starting feeding children with complementary feeding at 6-8 months	383	1804	21.2	148	754	19.6	0.362
Practices							
Children breastfed until two years [§]	39	502	7.8	15	179	8.4	0.068
Children given complementary foods at 6-8 months [¶]	259	319	81.2	101	123	82.1	0.823
Children aged 6-23 months given iron-rich or iron-fortified complementary foods during the past 24 hours	749	1804	41.5	533	754	70.7	<0.001
Children aged 6-23 months were given meat during the past 24 hours	715	1804	39.6	329	754	43.6	0.061
Children with minimum dietary diversity ^{††}	929	1804	51.5	420	754	55.7	0.052
Children with minimum meal frequency [♠]	508	1804	28.2	211	754	28.0	0.928
Children with minimum acceptable meal frequency [♠]	188	1804	10.4	90	754	11.9	0.262
Information sources							
Mothers ever received breastfeeding information during pregnancy or after delivery	469	1804	26.0	265	754	35.2	<0.001
Mothers ever received complementary feeding information during pregnancy or after delivery	293	1804	16.2	195	754	25.9	<0.001

[†]Number of caregivers who responded positive on the knowledge/practices.

[‡]Total number of mother eligible for the question.

- Only children aged 20 to 23 months were used to calculate this indicator (From “Indicators for assessing infant and young child feeding practices”).

[¶]Only children aged 6 to 8 months were used to calculate this indicator (From “Indicators for assessing infant and young child feeding practices”).

^{††}Minimum dietary diversity: the indicator was four out of seven food groups per day. The proportion of children aged 6-23 months who receive foods from four or more food groups was estimated (From “Indicators for assessing infant and young child feeding practices”).

§ Minimum meal frequency: the proportion of breastfed and non-breastfed children aged 6-23 months who received solid, semi-solid, or soft foods (also including milk for non-breastfed children) the minimum number of times or more (From “Indicators for assessing infant and young child feeding practices”).

¢ Minimum acceptable diet: Proportion of children aged 6-23 months who reached a minimum dietary diversity and minimum meal frequency (From “Indicators for assessing infant and young child feeding practices”).

In the semi-structured interviews, pregnant women and mothers generally did not have a clear idea about exclusive breastfeeding and its recommended duration. All the interviewed pregnant women thought children should be given water during the exclusive breastfeeding period (up to six months after delivery) due to the following reasons: children may get sweaty, be thirsty, their mouths may be dry, water can replenish children’s energy and because other peoples’ advice.

Interviewed pregnant woman 1 (aged 37 years, 37 weeks of gestation, primary school education, shuangshu township) said, “Children may be thirsty (if fed only by breast milk), just like adults drink milk, milk is milk, water is water.”

Mothers’ reasons to give water to their children were: children were thirsty, refused breast milk, their stools were dry, no breast milk after delivery, hospital information. In addition, mothers fed formula or noodles to their children younger than six months, as they thought breast milk was not enough for children. The duration of exclusive breastfeeding given by pregnant women and mothers varied from 3 months to 12 months.

Interviewed mother 1 (aged 28 years, child aged 5 months, junior college education, Xishan township) said, “Sometimes, my child’s digestion was not good, that is, his stool was dry, I would give him some water to help him digest.”

Interviewed mother 2 (aged 31 years, child aged 2 months, middle school education, Shuangshu township) said, “The doctor told me I should give some water to my child.”

Sources of infant feeding information

Around 50% of caregivers reported having received feeding information from their relatives and friends, followed by health facilities and communities accounting for about 30% (Figure 1). Information from mass media and books dropped from around 20% in

2012 to less than 10% in 2018, whereas Internet and mobile phones as an information source increased to more than 10% in 2018.

In the interviews, pregnant women and mothers said that they received feeding information from the Internet (Baidu search engine) (n=18), hospitals (n=17), apps on their smartphones (n=13), the elder people (n=7), their own experience (n=4), maternal and child health booklets developed by local health institutions (n=2), and books (n=1).

Although the Internet seemed to be one of the most important sources for feeding information, pregnant women and mothers did not completely believe this information. They often referred to comments from other people, health workers, elder people at home or books before they accepted a specific piece of information.

Interviewed pregnant woman 2 (aged 24 years, 23 weeks of gestation, middle school education, Weiyuan township) said: "I still believe doctors, and the information from the internet is only as a reference".

Interviewed mother 3 (aged 27 years, child aged 5 days, junior college education, Weiyuan township) said: "I often searched several browsers at the same time and reviewed comments from other people, but I did not believe completely most of the time."

Interviewed mother 4 (aged 24 years, child aged 1 day, technical secondary school education, Weiyuan township) said: "I often read the information which had the most comments."

Use of smartphone and WeChat

Smartphone and WeChat app usage were very popular among mothers. More than 80% of mothers were currently using both smartphone and WeChat app in their smartphones (Table 3). However, only around half of the grandparents were currently using smartphones, and less than 30% of them used WeChat app. Nearly 80% of mothers used WeChat for more than one hour every day. Around 30% of caregivers followed Infant and young child feeding official accounts, and 75.4% of them were willing to receive information from WeChat official accounts.

Table 3 Mothers' and grandparents' use of smartphones and WeChat in the follow-up survey in 2018 (N=493[†])

	Mothers		Grandparents		Total	
	n/N	%	n/N	%	n/N	%
Smartphone use						
Using smartphones	260/292	89.0	106/201	52.7	366/493	74.2
Smartphones can access the internet	236/260	90.8	56/106	52.8	292/366	79.8
Access the internet						
At home or the workplace	157/258	60.9	43/62	69.4	200/320	62.5
Mobile phone traffic	96/258	37.2	17/62	27.4	113/320	35.3
Other	5/258	1.9	2/62	3.2	7/320	2.2
WeChat use						
Using WeChat	236/292	80.8	58/201	28.9	294/493	59.6
Chat for more than one hour every day	(183/236)	77.5	33/58	56.9	286/294	73.5
Follow infant and young child feeding official accounts	92/236	39.0	7/58	12.1	99/294	33.7
Receive information from official accounts	178/236	75.4	34/58	58.6	212/294	72.1

† Among 754 interviewed caregivers, there were 292 mothers and 201 caregivers.

In the in-depth interviews, all the pregnant women and mothers had smartphones and used WeChat, and most of them used WeChat at least more than one year. Messaging, moments, official accounts, news, and WeChat group were the most used functions. However, only one pregnant woman and two mothers followed the infant and young child feeding-related official accounts, and they explained that they had never heard of those official accounts (n=20), or they thought it was unnecessary (n=3). Participants who followed could read and review the contents in official accounts when they were free.

Interviewed pregnant woman 3 (aged 27 years, 14 weeks of gestation, middle school education, Shuangshu township) said: “My (previous) children are very healthy, so I did not follow (the infant and young child feeding official accounts).”

Use experience of the WeChat feeding health education platform

Most interviewed pregnant women and mothers stated that the interface of the module block was good enough, and they liked it. One mother said using the interface was not so smooth.

For the *feeding lecture classroom* module, four pregnant women and five mothers liked pictures and text for feeding knowledge as they thought it was easy to understand, they got used to reading text, or they thought videos were too fast or a bit slow. Seven pregnant

women and eight mothers liked videos for feeding knowledge as they believed that videos were easy to understand, simple and convenient to watch. Other pregnant women and mothers expressed that pictures, text and videos were 'OK' for them. Most pregnant women and mothers said that they were interested in the feeding lecture classroom, and that the contents were easy to understand and useful.

Pregnant women wanted to know information on breastfeeding positions, how to increase breast milk supply, spitting up, child health, how to hold a baby, cough, sleep and antenatal care. Mothers wanted to know more about breastfeeding and complementary feeding, food allergies, illnesses, and growth development.

For the *Baby Growth Chart* module, five pregnant women and three mothers expressed that they could not understand the growth chart after they filled in the growth data.

Thirteen pregnant women and 14 mothers were willing to use this function to monitor the growth of their children. However, *interviewed mother 5 (aged 33 years, child aged 2 days, Primary school education, Weiyuan township)* said, *"I don't understand the function, so I would not use it."*

Discussion

Main findings

The results of this study indicate that both pregnant women and caregivers had limited knowledge about exclusive breastfeeding and complementary feeding in our research setting in rural China. The key IYCF indicators (including continued breastfeeding up to two years, minimum dietary diversity, minimum frequency diet, and minimum acceptable diet) were suboptimal and did not improve over the years. Furthermore, there was an absence of accurate information sources on infant feeding and child nutrition, and caregivers mostly received feeding information from their relatives and friends. Smartphones and WeChat app were widely used among pregnant women and mothers in this setting.

New channels are needed to deliver accurate infant feeding recommendations

Traditional infant feeding counseling provided by rural health facilities were of low quality and most of the feeding practices did not significantly improve over time. Around two-thirds of caregivers received no advice about infant feeding from health facilities. Rural health workers in China generally have limited education, lack expertise and motivation, and services provided by rural health facilities are generally of low quality [37-39]. Relatives (such as grandmothers) and friends with children were the main source of caregivers' feeding knowledge even though they are unlikely to have access to better information and may have misinformed mothers, which is consistent with the previous studies [17-19]. Grandmothers are generally less educated, rely on traditional methods, and may not understand the importance of appropriate nutrition [19].

Improved feeding knowledge and attitudes toward breastfeeding and complementary feeding are related to more positive child health outcomes [40, 41]. However, traditional health facility-based feeding counseling is usually not effective. Therefore, new channels are needed in rural China to deliver accurate infant feeding education and to improve child health.

WeChat could be a potential way to deliver infant feeding recommendations

In our study, nearly 80% of mothers in the study areas used WeChat, and around 70% used WeChat more than one hour every day. Women could easily access the internet on their smartphones, as WiFi was available at home or at the workplace. Although only 39% of mothers in the study areas followed child feeding official accounts, more than three-fourths were willing to receive feeding information in the format of text, pictures or videos through WeChat. WeChat feeding interventions should be mainly delivered to mothers because they are more like to consult external sources of feeding information [19], and mothers used WeChat more (80.8%) than grandparents (28.9%). Also, more than 80% of mothers in our study attended junior high school or above, while around 60% of grandparents were illiterate and could not read.

The WeChat feeding health education platform developed by our study team was generally accepted by women, as the information was easy to understand and useful. As women did not completely believe information from the internet, providing professional and authoritative infant feeding information is important. Our platform was based on the WeChat official account of the local Maternal and Child Health Family Planning Service Centre which was trusted by women. WeChat official accounts have shown potential to positively impact health behavior [28-29, 32]. One of the advantages of official accounts is that users can subscribe and receive selected news or information. Future studies are needed to test the effectiveness of a WeChat-based health education platform on key infant feeding practices in rural China.

However, our study also has limitations. This study took place in one Chinese rural county and caution is needed when generalizing the findings from this study to other settings. In addition, we did not conduct qualitative interview among mothers who had children aged 6-23 months, which may not get their depth opinions on WeChat as intervention to deliver infant and young child feeding information. However, data from the follow-up in 2018, 75.4% mothers aged 6-23 months were willing to received feeding information from WeChat official accounts

Conclusions

Our study indicates that caregivers' feeding knowledge and practices were poor in Huzhu County, and there was an absence of accurate information sources on infant feeding and child nutrition. WeChat, widely used in rural China, could be a potential way to deliver infant feeding recommendations to mothers in rural China. The WeChat-based feeding health education platform was generally accepted by mothers and could also be explored in future studies to maximize the effectiveness of IYCF programs.

Abbreviations

WHO: the World Health Organization; UNICEF: The United Nations Children's Fund; IYCF: infant and young child feeding; IMCI: integrated management of childhood illness; YYB: Ying Yang Bao; PPS, Proportional to Population Size; MNCH HHS, Maternal, Newborn and Child Health household survey.

Declarations

Ethical consideration and consent

The study was approved by the Ethics Committee of the Capital Institute of Pediatrics. All interviewees read the Information Sheet and provided written consent.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and/or analyzed in the current study are available from the corresponding authors upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

YFZ, SYC, QW, WW, and YWH designed the study; QW and YWH collected and analyzed data; YFZ, SYC, QW, MV and WW interpreted data; QW wrote the first and subsequent drafts of the paper; all authors reviewed the paper and approved the publication.

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Figures

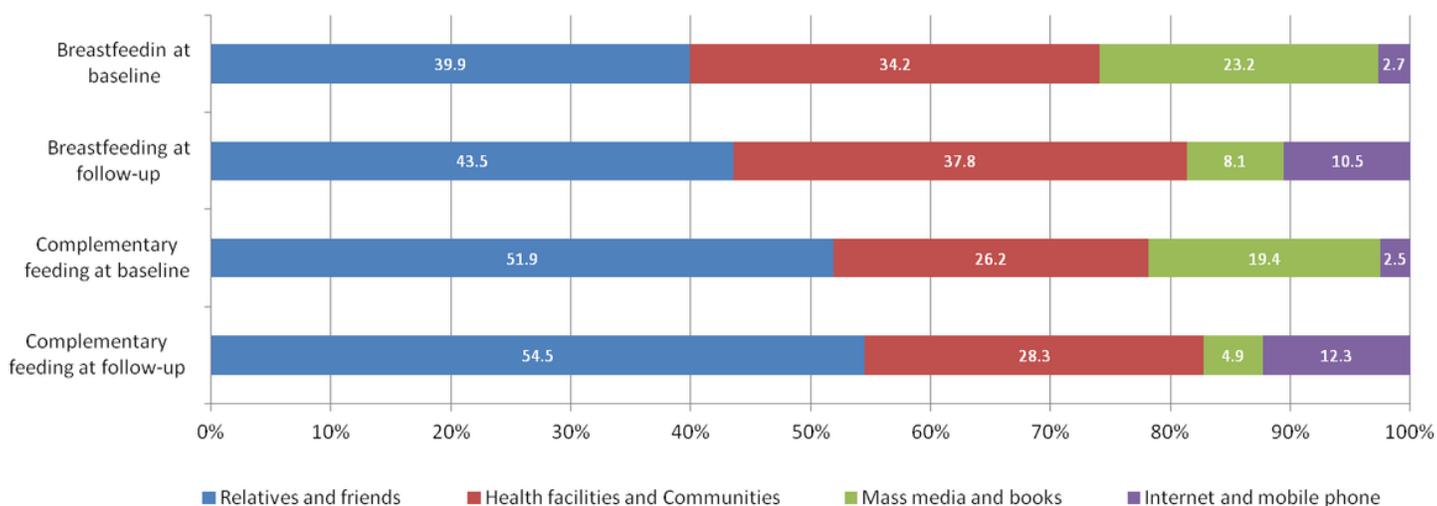


Figure 1

Distribution of sources for infant and young child feeding information

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