

Risk Assessment Studies
Report No. 73

SODIUM CONTENT IN CHINESE CONGEE

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EXECUTIVE SUMMARY

Excessive sodium intake is closely related to hypertension, which is a risk factor for non-communicable diseases (NCDs) including cardiovascular diseases and stroke. The World Health Organization recommends a daily salt intake of less than 5g (i.e. 2,000mg of sodium) for adults. In Hong Kong, the Government also published strategy and action plan in May 2018 to reduce 30% sodium intake in diet by 2025.

In Hong Kong, Chinese congee can be found on the menus of Chinese restaurants, fast food restaurants and congee speciality food premises. Traditionally, Chinese congee is one of the common food items consumed in Hong Kong, particularly during breakfast. There is a wide range of ingredients in congee, ranging from one single ingredient - rice (plain congee) to multiple ingredients, including lime-preserved egg, pork, beef, chicken, organ meats, pig blood curd, fish, dried scallop and sweet corn. Hence, the sodium level of Chinese congee hinges not only on the congee base, but also on the ingredients used. Congee is usually consumed in considerable volumes (normally more than 200ml for a bowl of congee), a significant amount of sodium may be consumed based on the sodium contents of the some types of congee.

The objectives of the study are (i) to measure the levels of sodium in relatively common congee available in the local market; (ii) to serve for monitoring of changes in the sodium contents in congee in the local market; (iii) to facilitate the discussion with the trade to provide healthier food products with less sodium contents through recipe reformulation; and (iv) to formulate dietary advice for the public to lower the sodium intake from consumption of congee so that consumers can make food choices to reduce sodium intake from the diet.

Between November and December 2022, a total of 174 non-prepackaged food samples covering 12 types (117 samples) of Chinese congee with ingredients, and the individual plain congee (24 samples) and seasoned congee (plain congee with seasoning) (33 samples) which could be available to consumers as the choice of congee base for cooking, were collected from Chinese restaurants, fast food restaurants and congee shops for analysis of sodium contents. The sodium contents were determined by the Food Research Laboratory (FRL) of the Centre for Food Safety (CFS).

Results showed that the average sodium content for the various samples of congee with ingredients was 270mg/100g, and the sodium contents ranged from 33mg/100g to 460mg/100g. The congee types with the top highest average sodium contents were congee with pig's liver (330mg/100g), congee with chicken (300mg/100g), congee with pig giblets (290mg/100g) and

congee with preserved egg and pork (290mg/100g).

The congee types with the lowest average sodium contents were congee with pumpkin (180mg/100g), congee with fish (220mg/100g) and congee with sweet corn (220mg/100g). None of the samples was considered “high” in sodium (i.e. over 600mg/100g) according to the information on CFS’ Shopping Card¹. There were large variations in the sodium contents of samples within same type of certain congee. Within the same type of certain congee, there were wide variations in the sodium content of samples. The observation of wide variations in sodium content in the same type of congee samples indicated the potential for sodium reduction in these congee. The average sodium content in congee with ingredient(s) was comparable to that reported in those earlier studies.

Conclusion

In this study, the sodium contents of certain types of Chinese congee, such as congee with pig’s liver, congee with chicken, congee with pig giblets, and congee with preserved egg and pork were relatively higher. The average sodium contents of congee with vegetables as major ingredients have generally lower sodium contents. The choice of congee types with different ingredient can greatly affect the sodium intake. Although none of the samples were considered “high” in sodium, the sodium intake from consuming certain types of congee, such as a bowl of congee with pig’s liver, may approach WHO’s recommended daily intake upper limit due to the considerable volume consumed. In addition, the sodium content of plain congee base was much lower than that of seasoned congee base, indicating that the sodium intake from the consumption of congee can be lowered by choosing plain congee as the congee base instead of seasoned congee, particularly for congee with ingredient(s).

Advice to the public

1. Pay attention to the sodium contents in Chinese congee and choose carefully.
2. Order congee cooked with plain congee base instead of seasoned congee base.
3. Pay attention to the amount of congee consumed. Consider sharing the congee when the portion is large.
4. Maintain a balanced diet with variety.

Advice to the trade

1. Reduce the sodium contents of the congee base and that of congee with ingredient(s) through product reformulation by making reference to the CFS's "Trade Guidelines for Reducing Sodium in Foods" (e.g. by choosing ingredients with lower sodium content, and

¹ https://www.cfs.gov.hk/english/programme/programme_nifl/programme_nifl_public_Resources_Shopping_Card.html

using natural ingredients for flavouring and marinating).

2. Provide the choice of plain congee with little or no seasoning added as the base for cooking congee with ingredient(s).
3. Apart from providing the standard portion size of congee, offer congee in smaller portion size for consumers to choose based on their needs.

Sodium Content in Chinese Congee

OBJECTIVES

This study aims to (i) measure the levels of sodium in relatively common Chinese congee available in the local market; (ii) serve for monitoring of changes in the sodium contents in congee available in the local market; (iii) facilitate the discussion with the trade to provide healthier food products with less sodium contents through recipe reformulation; (iv) formulate dietary advice for the public to lower the sodium intake from consumption of congee so that consumers can make food choices to reduce sodium intake from the diet.

BACKGROUND

2. Table salt is a chemical compound known as sodium chloride (NaCl), which consists of 40% sodium and 60% chloride. Sodium is essential for body functions. It helps to maintain fluid balance and acid-base balance in the body. It is required for nerve transmission and muscle contraction. However, excessive sodium intake is closely related to hypertension¹, which is a risk factor for certain non-communicable diseases (NCDs) including cardiovascular diseases and stroke.

3. The World Health Organization (WHO) recommends that the daily intake of salt of an average adult should be less than 5g (i.e. less than 2,000mg of sodium).²

Local Dietary Intakes of Sodium

4. In Hong Kong, according to the Population Health Survey 2020-22 conducted by the Department of Health, persons aged 15-84 years consumed 8.5g of salt (i.e. around 3,400mg sodium) per day³, which exceeded the WHO's recommendation of salt intake of less than 5g (2,000mg sodium) per day for adult.

5. In May 2018, the Hong Kong Government published “Towards 2025: Strategy and Action Plan to Prevent and Control Non-communicable Diseases in Hong Kong”, which set a list of actions that Hong Kong will pursue to achieve the committed NCD targets towards 2025. One of the 9 local NCD targets includes “A 30% relative reduction in mean population daily intake of salt/sodium”.⁴

Dietary Sources of Sodium of local population

6. Traditionally, Chinese congee is one of the common food items consumed in Hong Kong, particularly during breakfast. According to the studies from the Centre for Food Safety (CFS), the major sources of sodium intake of the local adult population include condiments and sauces (44%), soup (14%), processed meats (8%), bread (6%), dim sum (6%) and Siu mei / Lo mei (4%). Although Chinese congee is not among the top contributors to total sodium intake, this savoury item can be commonly found on the menus of Chinese restaurants, fast food restaurants and congee speciality food premises in Hong Kong.

7. There is a wide range of ingredients in congee, ranging from one single ingredient - rice (plain congee) to multiple ingredients, including lime-preserved egg, pork, beef, chicken, meat organs, pig blood curd, fish, dried scallop and sweet corn. Hence, the sodium content of Chinese congee hinges not only on the congee base, but also on the ingredients used. In addition, Chinese congee is usually consumed in considerable volume (much more than 200ml for a bowl of congee), a significant amount of sodium may be consumed based on the sodium contents of the some types of congee. Since only limited number of congee samples have been covered for analysis of their sodium contents, and may not be up-to-date due to recipe/formulation changes over the years. Sodium contents of various types of Chinese congee obtained in this study can provide latest data, which is useful for the CFS to formulate advice to the public for reducing sodium intake from the congee.

SCOPE OF STUDY

8. Relatively common Chinese congee samples c from restaurants and food outlets were covered in this study based on our review of the menus and subject to the availability of such congee. 12 types of Chinese congee with ingredients were covered in this study, namely, congee with preserved egg and pork (皮蛋瘦肉粥), congee with dried fish, peanut and pork (柴魚花生粥), boat congee (艇仔粥), congee with pig giblets (及第粥), congee with fish meat (魚片粥/ 魚腩粥), congee with pig's blood (豬紅粥), congee with beef (牛肉粥), congee with dace ball (鯪魚球粥), congee with pig's liver 豬鬔粥), congee with chicken (雞粥), congee with sweet corn (粟米粥), and congee with pumpkin (南瓜粥). Table 1 shows the 12 types of Chinese congee with ingredients covered in this study. In addition, the individual plain congee (白粥底)/ seasoned congee (有味粥底) from various outlets/ restaurants were also collected & tested to study the sodium content in these two kinds of congee bases for cooking of congee with ingredient(s) which could be available to consumers as a choice when ordering congee with ingredients.

Table 1: 12 types of Chinese congee with ingredients covered in this study

Type of Chinese congee with ingredients*		
1	Congee with preserved egg and pork	皮蛋瘦肉粥
2	Congee with dried fish, peanut and pork	柴魚花生粥
3	Boat congee	艇仔粥
4	Congee with pig giblets	及第粥
5	Congee with fish meat	魚片粥/ 魚腩粥
6	Congee with pig's blood	豬紅粥
7	Congee with beef	牛肉粥
8	Congee with dace ball	鯪魚球粥
9	Congee with pig's liver	豬潤粥
10	Congee with chicken	雞粥
11	Congee with sweet corn	粟米粥
12	Congee with pumpkin	南瓜粥

Remark: plain congee base (白粥底)/ seasoned congee base (有味粥底) was collected from each restaurant/ outlet to be used as 'sample blank' for study of background level of sodium content, when available & feasible.

METHODOLOGY

Sampling

9. Sampling was conducted between November and December 2022. The samples were collected from various outlets including Chinese restaurants, fast food restaurants and congee speciality food premises (those with more outlets were accorded higher priority). 10 or more samples (i.e. samples from different outlets / different brands) of each selected type of congee (except congee with pumpkin 南瓜粥 due to limited market availability) were collected to allow comparison of sodium contents from different food outlets/ restaurants/ brands. Not more than 3 sample types of the congee with ingredients was/ were collected from the same outlet / chained store / brand. In addition, the “plain congee base” and/or “seasoned congee base” for preparation of congee with ingredients were also collected from the same shop when available & feasible.

Laboratory Analysis and Data Collection

10. Laboratory analysis of sodium contents of congee samples was conducted by the Food

Research Laboratory (FRL) of the CFS. Congee samples were weighed and the total volume for consumption per serving was measured. The sodium contents of the samples were analysed using inductively coupled plasma-optical emission spectrometry (ICP-OES) after homogenisation and acid digestion.

Data Analysis

11. The sodium contents of the samples were presented as mg/100g of edible portion. Samples with sodium content not more than 120mg per 100g will be considered as “low” in sodium according to the Food and Drugs (Composition and Labelling) Regulations (Cap. 132 W)⁵ while those with sodium content more than 600mg per 100g will be considered as “high” in sodium according to the information on CFS’ Shopping Card⁶. The range of sodium contents of the samples were also compared with those obtained from previous studies from the CFS.

12. FRL analysed the sodium contents of the congee samples. The limit of detection (LOD) and limit of quantitation (LOQ) are 0.4mg/100g and 1.0mg/100g respectively.

RESULTS AND DISCUSSIONS

Sodium Content of Chinese Congee

13. A total of 174 samples (including 24 samples of plain congee base (白粥底)/ 33 samples of seasoned congee base (有味粥底)) were collected and tested, which covered 12 types (117 samples) of Chinese congee with ingredient(s). Results showed that the sodium contents of these samples varied among different types of congee and within the same type of congee. The sodium contents of the 12 types of congee with ingredient(s) are summarised in **Table 2**. The average sodium content for all the congee with ingredient(s) samples was 270mg/100g, and the sodium contents ranged from 33mg/100g to 460mg/100g.

Table 2. Sodium contents of 12 types of Chinese congee with ingredient(s)

Type of Chinese Congee	Number of samples	Sodium content (mg/100g)		
		Average	Minimum	Maximum
Congee with preserved egg and pork	12	290	250	350
Congee with dried fish, peanut and pork	10	240	33	400
Boat congee	10	270	220	340
Congee with pig giblets	10	290	250	350
Congee with fish meat	10	220	170	260
Congee with pig's blood	10	270	170	360
Congee with beef	10	260	170	320
Congee with dace ball	10	280	250	340
Congee with pig's liver	10	330	230	460
Congee with chicken	10	300	240	390
Congee with sweet corn	10	220	160	310
Congee with pumpkin	5	180	130	240
Overall	117	270	33	460

Average sodium content of congee with pig's liver ranked the highest followed by congee with chicken, congee with pig giblets and congee with preserved egg and pork

14. Amongst the 12 types of congee, the congee types with the highest average sodium contents were, in descending order, congee with pig's liver (330mg/100g), followed by congee with chicken (300mg/100g) and congee with pig giblets (290mg/100g). Amongst the types of congee with ingredients, the lowest average sodium contents were congee with pumpkin (180mg/100g), followed by congee with fish meat (220mg/100g) and congee with sweet corn (220mg/100g). None of the samples in this study were considered "high" in sodium (i.e. over 600mg/100g) according to the information on CFS' Shopping Card. Within the same type of certain congee, there were wide variations in the sodium content of samples. The observation of wide variations in sodium content in the same type of congee samples indicated the potential for sodium reduction in these congee.

Average sodium content of plain congee base is much lower than seasoned congee base

15. The average sodium content of 24 samples of plain congee base samples collected was 8.6 mg/100g (ranged from 3.5mg/100g to 37mg/100g). The average sodium content of 33 seasoned congee base samples collected was 110mg/100g (ranged from 6.4mg/100g to 300mg/100g). The average sodium content of plain congee were 13 times lower than that of seasoned congee, reflecting that the sodium intake from the consumption of congee can be lowered by choosing plain congee as the congee base instead of the seasoned congee.

Congee with vegetable as major ingredient generally have lower sodium content

16. The average sodium contents of 2 types of congee with vegetables as major ingredients have generally lower sodium contents, namely congee with sweet corn (average sodium content is 180 mg per 100 g) and congee with pumpkin (average sodium content is 220 mg per 100 g respectively), which were among the lower average sodium contents of the various types of Chinese congee with ingredient(s). Amongst the 10 types of Chinese congee with non-vegetarian ingredients, congee with fish was found to have the lowest average sodium content of 220mg/100g.

Differences in the sodium content of certain types of congees

17. There were generally 1 to 2 times differences between the samples with highest and lowest sodium contents for congees with ingredient(s) (i.e. congee with preserved egg and pork, boat congee, congee with pig giblets, congee with fish, congee with pig's blood, congee with beef, congee with dace ball, congee with pig's liver, congee with chicken, congee with sweet corn, congee with pumpkin). Such difference was more than 10 times for certain types of congees such as congee with dried fish, peanut and pork. The large variation in sodium content reflected room for sodium reduction in congee.

Comparison with previous study

18. The average sodium content of congee with ingredient(s) was comparable to that reported in the previous CFS studies (**Table 3**).

Table 3. Comparison of the average sodium content in congee with ingredient(s) with previous CFS studies

Average sodium content in current study (mg/100g)	Average sodium content in 2012' CFS study (mg/100g)	Average sodium content in 2006' CFS study (mg/100g)
260	280	280

Contribution to WHO's recommended daily sodium intake upper limit

19. Table 4 shows the estimated mean sodium intake per bowl of each type of congee and its contribution to WHO's recommended daily sodium intake upper limit.

Table 4. Sodium intake of one bowl of congee compared with WHO's recommended daily sodium intake upper limit

Item	Type of Congee Product	Number of samples	Sodium Mean [range] (mg/100g)	Mean Sodium Intake per bowl of congee (mg)	Contribution to WHO's recommended daily sodium intake upper limit (2000mg)
1	Congee with preserved egg and pork (皮蛋瘦肉粥)	12	290 [250-350]	1600	80%
2	Congee with dried fish, peanut and pork (柴魚花生粥)	10	240 [33-400]	1200	60%
3	Boat congee (艇仔粥)	10	270 [220-340]	1500	75%
4	Congee with pig giblets (及第粥)	10	290 [250-350]	1800	90%
5	Congee with fish (魚片粥 / 魚腩粥)	10	220 [170-260]	1300	65%
6	Congee with pig's blood (豬紅粥)	10	270 [170-360]	1500	75%
7	Congee with beef (牛肉粥)	10	260 [170-320]	1400	70%
8	Congee with dace ball	10	280 [250-340]	1600	80%

Item	Type of Congee Product	Number of samples	Sodium Mean [range] (mg/100g)	Mean Sodium Intake per bowl of congee (mg)	Contribution to WHO's recommended daily sodium intake upper limit (2000mg)
	(鮫魚球粥)				
9	Congee with pig's liver (豬潤粥)	10	330 [230-460]	2000	100%
10	Congee with chicken (雞粥)	10	300 [240-390]	1800	90%
11	Congee with sweet corn (粟米粥)	10	220 [160-310]	1200	60%
12	Congee with pumpkin (南瓜粥)	5	180 [130-240]	940	47%
A	Plain congee base (白粥底)	24	8.6 [3.5-37]	43	2%
B	Seasoned congee base (有味粥底)	33	110 [6.4-300]	1000	50%
	OVERALL	174	3.5 – 460	(43 – 2000)	(2% - 100%)

20. From the results tabulated in Table 4, scenarios of consuming one bowl (average about 500 g) of the various types of congee can be simulated to assess the sodium intake for the consumer, and to estimate the percentage contribution to WHO's recommended daily sodium intake upper limit. Assuming a consumer eats one bowl of Chinese congee for a meal, the average sodium intake for consuming one bowl of congee with pig's liver reaches WHO's recommended daily sodium intake upper limit. whereas the average sodium intake per bowl of congee with pumpkin would contribute to about half (47%) of WHO's recommended daily sodium intake upper limit. Therefore, the choice of congee with ingredients will greatly affect the sodium intake. While the average sodium intake of one bowl of seasoned congee base would contribute to about half (50%) of WHO's recommended daily sodium intake upper limit, the average sodium intake of one bowl of plain congee base (with little or no seasoning added) would contribute only to 2% of WHO's recommended daily sodium intake upper limit. This shows that choosing plain congee base with little or no seasoning added as the base for making the congee with ingredient(s) could help reduce the amount of sodium intake by a large extent. Because there was a wide variation in sodium content in the seasoned congee base in various

samples, such finding indicated that there is potential for reduction of sodium in the seasoned congee base.

Limitations of the study

21. Only limited samples were collected in each type of Chinese congee with ingredient(s). Therefore, the results of this study could only represent a snapshot of sodium contents in some common types of Chinese congee on the market.

CONCLUSION AND RECOMMENDATIONS

22. The sodium contents of certain types of congee, such as congee with pig's liver, congee with chicken, congee with pig giblets and congee with preserved egg and pork were relatively higher. The average sodium contents of congee with vegetables as major ingredients have generally lower sodium contents. The choice of congee with different ingredients can greatly affect the sodium intake. Although none of the samples were considered "high" in sodium, the sodium intake from consuming certain types of congee, such as a bowl of congee with pig's liver, may approach WHO's recommended daily intake upper limit due to the considerable volume consumed. In addition, the sodium content of plain congee base was much lower than that of seasoned congee base, indicating that the sodium intake from the consumption of congee can be lowered by choosing plain congee as the congee base instead of seasoned congee, particularly for congee with ingredient(s).

Advice to the public

1. Pay attention to the sodium contents in Chinese congee and, choose carefully.
2. Order congee cooked with plain congee base instead of seasoned congee base
3. Pay attention to the amount of congee consumed. Consider sharing the congee when the portion is large.
4. Maintain a balanced diet with variety.

Advice to the trade

1. Reduce the sodium contents of the congee base and that of congee with ingredient(s) through product reformulation by making reference to the CFS's "Trade Guidelines for Reducing Sodium in Foods" (e.g. by choosing ingredients with lower sodium content, and using natural ingredients for flavouring and marinating).
2. Provide the choice of plain congee with little or no seasoning added as the base for cooking congee with ingredient(s)

3. Apart from providing the standard portion size of congee, offer congee in smaller portion size for consumers to choose based on their needs.

References:

1. World Health Organization (2003). WHO Technical Report Series No. 916, Diet, Nutrition and the Prevention of Chronic Diseases: Report of a Joint WHO/FAO Expert Consultation.
https://apps.who.int/iris/bitstream/handle/10665/42665/WHO_TRS_916.pdf
2. World Health Organization (2012). Guideline: sodium intake for adults and children.
<https://apps.who.int/iris/rest/bitstreams/110243/retrieve>
3. The Department of Health, The Government of Hong Kong Special Administration Region (2023). Report of Population Health Survey 2020-22.
<https://www.chp.gov.hk/en/features/37474.html>
https://www.chp.gov.hk/files/pdf/dh_phs_2020-22_part_2_report_eng_rectified.pdf
4. The Government of Hong Kong Special Administration Region (2018). Towards 2025: Strategy and Action Plan to Prevent and Control NCD in Hong Kong.
<https://www.change4health.gov.hk/en/saptowards2025/publications.html>
5. Hong Kong e-Legislation. Food and Drugs (Composition and Labelling) Regulations (Cap. 132 W)
<https://www.elegislation.gov.hk/hk/cap132W>
6. Centre for Food Safety (2020). Shopping Cards.
https://www.cfs.gov.hk/english/programme/programme_nifl/programme_nifl_public_Resources_Shopping_Card.html