

QUESTION: *How many women menstruate? How many use menstrual cups? What is the environmental impact?*

WOMENA CONCLUSIONS/RECOMMENDATIONS

How many menstruate? a figure of 26% is often given, but we have seen no reference to the methodology for calculating this figure. It might have been correct when it was first quoted, in 2012, but has since decreased. We believe an estimate of ‘around 25%’ would be justified.¹

How many menstruate on a given day? The figure of 800 million was usually given in older sources, again without stated methodology. WoMena estimated in 2018 that it was less than half of that: 300-350 million, and it seems that newer sources have come to the same conclusion.

How many times does a menstruator menstruate per year? Many sources seem to be based on once a month. We estimate that ‘13 times a year’ would be more accurate (with 28 day cycles).

These estimates are important for planning operational response, including in refugee settings. We believe the above estimates are adequate for that purpose. However, in order to calculate risk for different menstrual products and practices,

How many are using menstrual cups (MC)? We have found little basis to inform an estimate. Small scale studies give some indication of prevalence of use, but need to be reviewed systematically before arriving at a global estimate. Meanwhile, estimates of sales may supplement. The global market value was around 1.2 billion USD in 2018, growing at appr. 100 million yearly. We have not been able to access estimates of how many MCs that would involve, but until that is available we estimate this would translate into 30-40 million MCs yearly (if we model 30-40 USD per cup). Since they last up to 10 years, we assume that more women are using.

How many MCs are used? MCs can last up to 10 years. If used consistently, that would mean 3-4 MCs over the reproductive age life span. If used only for one year, it would be 35. Figures for disposable products such as tampons or pads are often quoted as 2-4 products per day (again with limited information on methodology). For each menstruator, that would mean 5-10,000 products over the reproductive years. Reusable pads are marketed as lasting 1-2 years, and needing 4-5 pads at a time, or 2-300 pads over a lifetime.

Comments are warmly welcome!

HOW MANY WOMEN MENSTRUATE?

‘*Women of reproductive age*’ is a widely used demographic term, used to refer to females aged 15-49, with the UN as a widely used source. The estimated number of females in this age group in 2021 is 1’931’591, and total world population is 7,874,966, giving a proportion of 24.5%. It was 26% in 2012. It ranges between around 20% in Japan and around 30% in Iran (UN 2019). The rule of thumb: ‘approximately 25% of the population are women of reproductive age’ would seem appropriate.

¹WoMena recognises that not all females menstruate, and not all menstruators are female.

The term is used for statistical purposes, rather than indicating biological function. To be more biologically precise, that is, determining how many women are of *menstruating age*, one needs to know the age of menarche (first menstruation) and menopause (cessation of menstruation). There is little up-to-date information on this. One of the few sources, from 1998, concluded that the global average age at menarche was about 14 (range 13-16), with African countries higher than the rest. The average for menopause was 50 (range 49-52) (Morabia and Costanza 1998) giving an average 37 years of menstruating age. This is confirmed by national level studies, small-scale studies, for example one study from Uganda finds the average age of menarche to be 14 (MoH, Uganda 2016).

Although a number of studies indicate a declining age at menarche in High Income Countries (HICs), there is little information on trends from Middle and Low-Income Countries (MLICs). One of the few, from South Africa, shows age at menarche having declined from 14.9 in 1956 to 12.4 for black girls, and from 13.1 in 1977 to 12.5 for white girls, with the authors concluding that the convergence of ages reflected nutritional and socio-economic changes (Jones et al., 2009). Researchers find it difficult to make a conclusion on global levels (Parent, et al. 2003; Sommer 2013).

Beyond *menstruating age*, one might look at whether menstruation *actually occurs*. We have seen no estimates of this in the literature, apart from our own (WoMena 2018). Yet, if one subtracts the time where women are pregnant or breastfeeding (globally, 2.4 births per woman, and 3-6 months post-partum amenorrhea, or in sub-Saharan Africa 4.7 births) and adjusts for other bleeding, for example lochia (bleeding immediately postpartum), this would mean a little more than one year per birth when menstruation does not occur. This would counter balance declining age at menarche.

There have also been suggestions that in HICs a growing number of women are using contraception which suppresses menstruation (e.g. hormonal IUDs) (Forster 2017) but this should probably be taken as a hypothesis until better information is available.

On any given day, until recently, many sources stated that 800 million people were menstruating, but without giving a methodology for arriving at that estimate (WoMena 2018). WoMena estimated in 2018 that one might estimate the number by multiplying the number of menstruators (1.8 million) by 5/28 (if one uses the widely quoted estimates of 28 day cycles, and five days of menstruating). This would give 300-350 million. More recent publications seem to agree with this. An article in the Lancet states that it is 300 million, but without giving the basis for the calculation (Lancet Child and Adolescent, 2018).

In addition it would be helpful to estimate the numbers who are female, but not menstruating, as well as the inverse, although at this point we assume this would not change the statistic markedly.

WE CONCLUDE that, as often is the case, it is better to be approximately right than precisely wrong. We therefore suggest to state that the proportion of the population who are females of reproductive/menstruating age be stated as 'approximately 25%', and that the number of people menstruating on any given day is 300-35 million.

Translating this into something more concrete: how many 16 year old school girls in Uganda would need menstrual products? the calculation would be: a total population of 42 million, of whom around 530'000 are girls aged 16 (due to population growth the number in each succeeding age cohort is higher, e.g. there are appr 600'000 girls aged 14 (calculations based on UN Population Prospects 2017 revision). Very few are pregnant at that age, so they would need one cup each (lasting 10 years), or one package of reusable pads (lasting 2 years), or 100-200 disposable pads, if they use pads per period (over 1 year).

HOW MANY WOMEN ARE USING MENSTRUAL CUPS?

WHERE TO FIND THE DATA? We found it a challenge to find data on this. We have found very few comparable estimates of prevalence of use of different products, including cups. Therefore, we tried another approach, through data on sales. This is a challenge, since complete market analyses may cost 4,000 USD or more, which we cannot afford, and partial analyses refer to different groupings of products (menstrual pads, tampons, menstrual cups, menstrual panties, panty liners, intimate cleaning liquid and razors). In particular, data on market value do not always provide access to data on the number of products sold.

We attempted to find data from the Danish Statistical office consumer statistics, but so far with no success. Statistics Denmark estimated that Danish women used about 414 million DKK per year on menstrual products (Oehlenschläger 2012), but not disaggregated by type. We therefore assembled open access market analyses, searched for data on individual producers, or contacted them directly (altogether 6 producers). Some were forthcoming in providing general data, but requested anonymity. We therefore do not refer by name to all.

SALES DATA: With respect to the global market for menstrual hygiene products in general (pads, tampons etc.) it is expected to grow by 6.9% per year by 2026, from around 20 billion USD to around 38 billion USD. The main product being sold is menstrual pads (with estimates ranging between around half and two thirds of the total market), although tampons are also popular, particularly in North America and Western Europe (Persistence Market Research 2018). Another analysis quotes similar overall numbers for levels and growth and notes the drivers of the change: urbanization, higher disposable income, more women working outside the home, but also growing concerns about the safety and ecological footprint of the different products (Allied market research 2018). The analyses note that this is a very lucrative and promising market, with particular opportunities in developing countries (especially in Asia), and fierce competition. The Economist also refers to robust growth in sales, and notes that just one producer of Tampax (Tampax Pearl) had sales of around 290 million USD in 2017 (Economist). Another analysis focuses on what seem to be the biggest brands – Diva, Lunette, The Keeper, Femmicycle and Mooncup (Marketer’s Media 2018).

Amazon lists the 100 best sellers of cups which they have for sale, according to how many Amazon itself has sold, with Diva cups at the top (Amazon). Yearly sales of Diva cups (through any channel) were reportedly around 20 million USD per year, up from 2.5 million USD five years earlier (Economist; Nguyen 2017). One peer reviewed article concludes that 100 million softcups were sold 1996-2011, however these are disposable (women use 12-13 cups per cycle, and therefore not comparable, but that would translate into 600,000 user years (North and Oldham 2011)

Other producers we have contacted generally refer to cumulative numbers for their brand in the order of magnitude of 100,000-400,000, and note exponential growth, as for Diva above. There are minimum 100 top sellers through Amazon alone.

One market analysis concludes that the global market is *‘USD 995 million in 2016 and is expected to reach USD 1.4 billion by 2023, growing at a CAGR of around 4.6% during the forecast period of 2017 to 2023’* (Cision PRNewswire 2017). A more recent, but consistent, estimate is that the global market in 2018 was 1.2 billion USD, growing to 1.89 billion in 2026 (Ridder, 2020).

However, how these market levels translate into numbers of MCs is not very clear. One possible avenue is to estimate from known MC prices. Eijk et al note that they found 199 brands sold in 99 countries, with prices ranging from US\$0.72–46.72 (median \$23.3) (Eijk et al, 2019). UNICEF in its guideline on menstrual hygiene materials estimates prices between 10-40 USD. If one takes the total

market in 2021 as around 1.5 billion USD, and uses the Eijk et al median cost, that would translate into 64 million cups sold per year, but we assume more precise data are available in the market analyses. We could also not find data on average years of use - whereas MCs are marketed as lasting up to ten years, we are not clear on the average length of use.

WE CONCLUDE: Estimates of prevalence, or preferably user-years, are essential in order to estimate risk (e.g. of infection). Yet, data are too heterogeneous, or inaccessible, to give good estimates. Meanwhile, it would seem reasonable to estimate 10-60 million sales yearly - we believe our best point estimate might be 30-40 million sales yearly. Prevalence is presumably higher, if MCs are used 1 year or more, and it is growing. WoMena is advocating for further research.

HOW MANY PRODUCTS ARE USED?

There are few estimates in scientific literature, but many sources suggest that women using disposable pads use 2-4 per day. If a woman bleeds 5/28 days, this means 130-260 pads/tampons per year, or 5,000-10,000 over her reproductive years. If a woman uses a cup (which lasts 10 years), this would replace up to 2500 pads/tampons. If she uses reusable pads (which are marketed as needing 4 pads lasting for a year) each pad would replace 33-65 disposables.

Every day, if all women used disposable products, that would be 800 – 1600 million pads/tampons.

We are not plastics experts, but the BBC estimates a pad may contain as much plastic as 4 plastic supermarket shopping bags, and take 500 years to biodegrade (Cooper 2018).

UPDATING

WoMena stays actively updated and follow any changes in the recommendation from the various health authorities and manufacturers, as well as noting any anecdotal evidence on adverse events which may emerge. Since we are primarily based in Denmark and Uganda, wherever available we refer to recommendations in those countries, as well as from international sources such as WHO, or expert opinion.

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