In English, a distinction is made between mass nouns (which name things that are indivisible, such as water or ingenuity) and countable nouns (which name things that come in discrete units, such as leptons or students).

A special class of mass nouns denotes indeterminate aggregations of things that may be countable but are treated as a single group, such as jargon, research, or literature. These mass nouns are usually treated as singular in US English usage, even though they may encompass many items, and thus take a singular verb.

While choosing the incorrect word (less vs fewer, amount vs number) to go with a noun may not affect the meaning of your sentence, it sounds sloppy.
“Amount” is used with mass* nouns; “number” is used with countable nouns

Use “amount of” for quantities that have been measured or calculated

“A trace amount of S was shown to greatly alter surface mass transport on Cu(111).”

Use “number of” for quantities that have been counted

“A large number of studies have generated conflicting results.”

(Ms. P deplores “a large number,” too [10, 50, 100, 1000??]; why not simply tell the reader, “It’s a whole bunch, but I’m too lazy to look it up”?)

*cannot be divided into discreet units; unquantizable

Examples of recent Phys. Rev. papers that use the incorrect word in the title:

“Suppressing epidemics with a limited amount of immunization units.”
(units are counted; should be number of immunization units)

“Quantum, classical, and total amount of correlations in a quantum state.”
(correlations are counted; should be number of correlations)

“Raman study on defective graphene: Effect of the excitation energy, type, and amount of defects.” (defects are counted; should be number of defects)

And permanently enshrined in Ms. P’s hall of shame:
“There is a large amount of literature on this topic, and a reader could do a lot worse than refer to Bell’s original papers [1].” [quoted verbatim from a PRL!]
And while we’re on the subject...

<table>
<thead>
<tr>
<th>Mass nouns</th>
<th>Countable nouns</th>
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<tbody>
<tr>
<td>amount</td>
<td>number</td>
</tr>
<tr>
<td>less than</td>
<td>fewer than</td>
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<tr>
<td>as much as</td>
<td>as many as</td>
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</tbody>
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use the correct modifier